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NEW COMPUTER EXPRESS

First news, first reviews – every week

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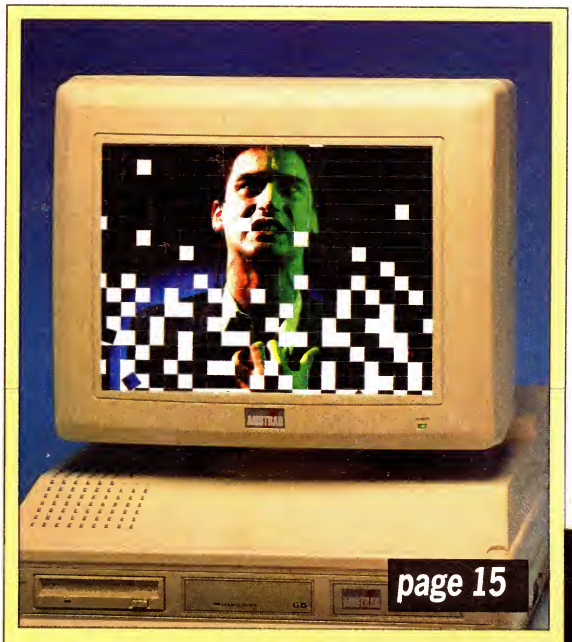

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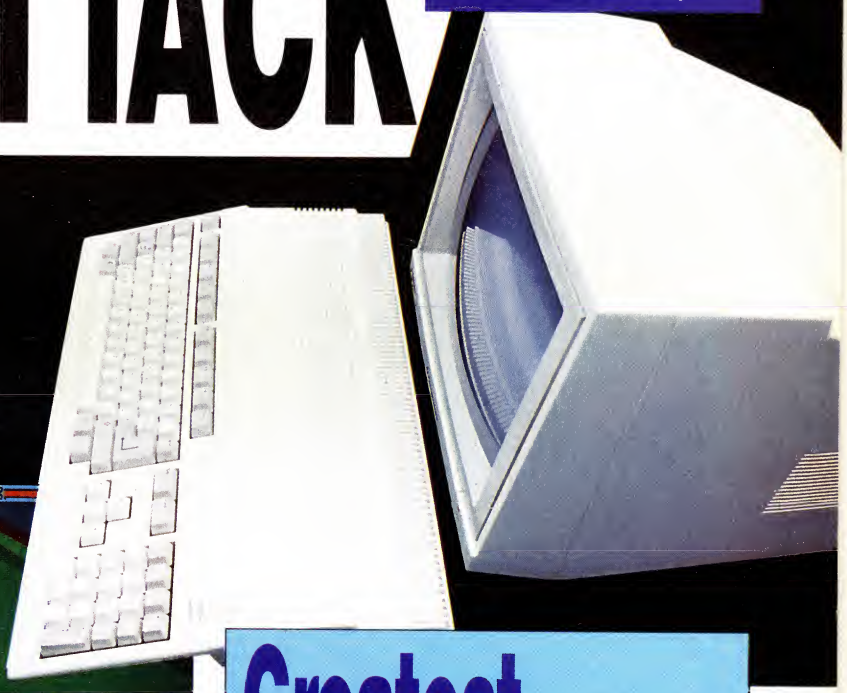
AMIGA PACK ATTACK

Commodore reaches for the sky with new bundle –p2



VIRUSES

Vital facts to stop you cracking up

Columns for YOUR machine

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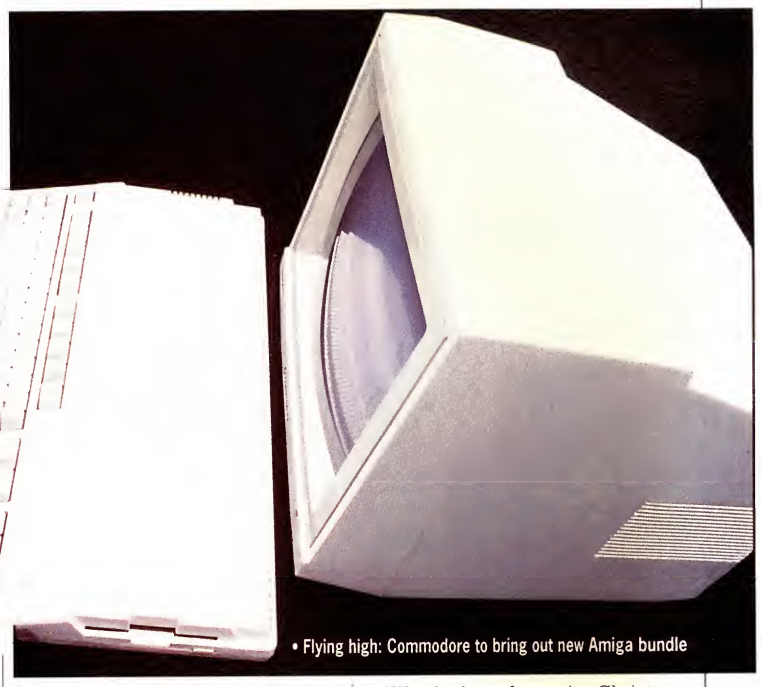
AMIGA FLIES HIGH WITH NEW PACK



• Flying high: Commodore to bring out new Amiga bundle

A new deal for potential Amiga owners has been strung together by Commodore, which offers freebies notionally worth £200 above the asking price.

This follows last week's exclusive news in *Express* that Atari is planning to rejig its successful ST Superpack with a line up of more than twenty top games.

Commodore, however, is hoping to attract new punters with an offer of a different ilk.

The Amiga bundle costs £499 (£100 above the normal price) and comes with a TV modulator, three games, a disk wallet and a paint package. However, the company has also thrown in an 'airmiles' voucher worth £160. In effect, Amiga buyers will be getting a return trip to Paris, Amsterdam or Brussels absolutely free. The offer kicks off on April 1st and should run through to the autumn, perhaps even up until Christmas.

Commodore has made no bones of the fact that it wants to attract the "yuppie" type to Amiga computing. An offer of free airmiles is sure to appeal to this audience many of whom are beginners to home computing.

One of the games is the graphically stunning *Who Framed Roger Rabbit* which costs £30. The other two are Logotron's *Starray* and Hewson's well received *Nebulus*. Best Publishing supplied the paint package *Spritz* which normally sells at around £50. In all the freebies are worth just under £300.

The standalone A500 will also be available at its normal price of £399. Atari has found that its Superpack – also £100 more than the standalone machine – has proved to be the most popular purchase. According to Commodore the special bundles put out over the past few months in conjunction with distributors will be discontinued.

"We had a fantastic Christmas with the Amiga and I think there's a lot of awareness about what the machine can do," commented Commodore's Dean Barrett to *Express*. "We're looking at the yuppie market but we've also found that many Amiga buyers are between the age of 18 and 24. Travel is obviously very important to them."

He added: "People know that the Amiga is not just for games but also for hobbyist type activities such as art and music."

Obnoxious creature in computer link

Slimy TV cult hero Gilbert the Alien is set to appear on a computer game courtesy of Again Again.

The snotty nosed creature will be available for mainstream machines within the next six weeks. The game itself is an arcade adventure affair pitting Gilbert against his jealous pals on the planet Drill.

• Bogey man: Gilbert's micro debut

Gilbert, something of an obnoxious beast, has attained enormous popularity through the Saturday morning kids TV show *Get Fresh* with his irreverant style and unpleasant habits.

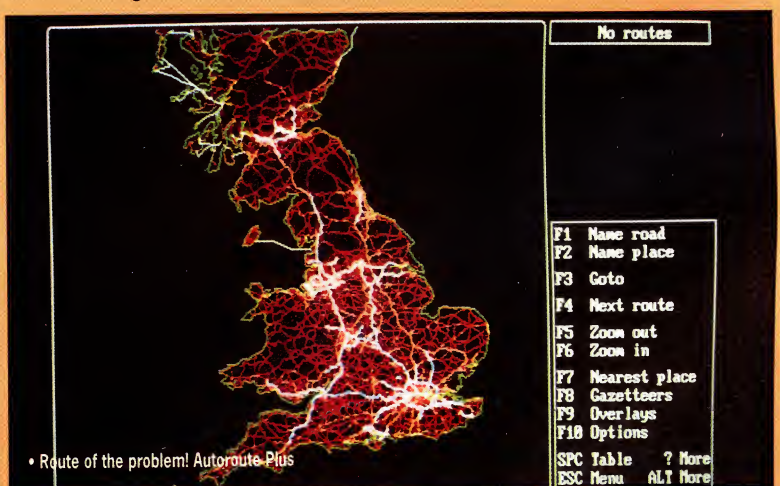
An Again Again spokesman told *Express*: "Tyne Tees gave us Gilbert's licence because they knew it would be a major project for us and not just another game." The game is being written by new outfit Enigma Variations. The firm plans to concentrate on licence characters for its games.

Take your PC on a spin

PC-owning drivers are being earnestly assured by NextBase that they really should take a look at *AutoRoute Plus*.

The £299 program is basically a colour computerised roadmap of Britain featuring 67,000 miles of roads and 33,000 place names. Users can zoom in on any area and take a print out.

The most interesting feature is a routing and scheduling system which finds the best route between two to 25 places. It is claimed that the optimising of stop offs via the program can "save up to 20 per cent of your driving time and cost".



• Route of the problem! Autoroute Plus

AutoRoute Plus **also offers printed out route directions. NextBase is pondering introducing an ST version of the system in the near future. More info on 0784 460077.**

ATARI REVELATIONS

The ever eclectic Atari has revealed a batch of new plans and new machines which will soon be storming into the computer arena.

At last week's CeBit computer show in Hanover Atari's UK boss Bob Gleadow told a select few journalists of far reaching plans covering the Folio Pocket PC, STacey laptop, Super ST, Mega ST 1 and the ST games console.

● **FOLIO POCKET PC:** In an unexpected move Atari is planning to produce a line up of at least five different pocket PCs for varying applications and users. These will include two A4 size PCs (the Folio 1 and 2) one of which will be a 286. Both machines will be the same size as Cambridge Computer's Z88.

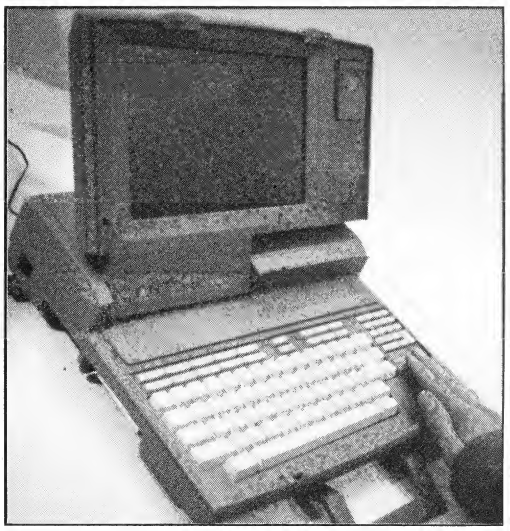
Also, in a bid to attract the very low end PC user, the firm will be introducing a £60 model of the Folio. This is being dubbed the "dumb" Folio since it will only be capable of word processing. A slightly higher priced model will also be launched incorporating a word processor, clock and diary.

● **STACEY LAPTOP:** For the first time a working model of the ST laptop was on view to the general public. That will cost less than 3,000 Marks in Germany, which amounts to under £1,000 in the UK. However, Atari may choose a lower price point when the STacey arrives in the UK in June. Atari has spent the last few months "fine tuning" the machine, which cost something in the region of $400,000.

• Mega 1: New mutant ST

As expected, it features a tracker ball mouse. It runs an 8 MHz 68000 processor with 1Mb of dimensioned memory. The laptop weighs about 14 pounds.

● **SUPER ST:** Despite its long running claims that there is no such thing Atari will in fact be launching a souped up version of the ST in September. Dubbed the TT, it is claimed to be able to run at five times the speed of a normal ST. It has 2 Mb of RAM and runs a 68030 processor. Prices are likely to begin at £999. On the TT Gleadow vowed: "I want the Archimedes market".

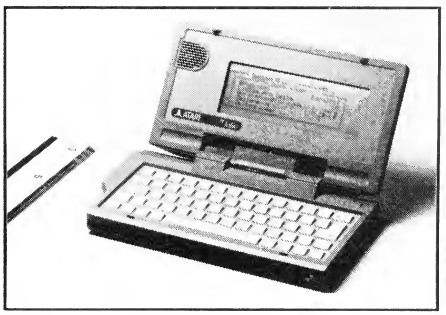


• STacey: Dropping into your lap in June

● **MEGA ST 1:** As first predicted in *Express* (Issue 12) Atari has launched a Mega ST 1. In effect this is a 1040 inside the three-sectioned case of a Mega ST. The Mega casing is generally regarded as being more stylish than the normal ST. The machine costs £599 with monitor. Atari will be bundling it with word processing software within the next few weeks.

● **ST CONSOLE:** That will arrive in the UK next September. Atari has already suggested that it will cost less than £100. The firm says that although the machine will be ready by the middle of the year it will take three months for software to be put on ROM.

Many have wondered at Atari's policy of announcing future plans a long way off from any possible launch. Gleadow explained that the firm wants to gauge public and press reaction to ideas before deciding to go ahead. "We're a people company," he said. He added: "Atari is a benevolent dictatorship so long as we're selling."



• Folio: New versions planned to suit all pockets

Slightly away from the computer market it is understood that Atari is also planning to launch a range of 14 different calculators which may be sold through selected petrol stations.

The world's biggest computer show...

CeBit, the world's ultimate computer show, kicked off last week with more than half a million visitors expected to pass through the doors at the Hanover Messe over the seven days.

The figures behind the event are astonishing. The 3,125 exhibitors fill up 325,000 square metres of floor space. They are crammed into 17 different halls many of which are the size of Olympia. Our man was there to see the thousands of machines and to hear the latest on high tech PC technology. For a full report turn to page 28.

Portable computing: Size is everything

The size and weight of power portable PCs could be on the way down, following the announcement of a remarkable new hard disk drive.

The tiny 20 Megabyte hard disk has been unveiled by Colorado based PrairieTek. All the memory capability has been squeezed onto two magnetic platters, each only two and a half inches in diameter.

The drive includes a motor as well as read and write heads, and it can store the same amount of information as a normal 3.5 inch hard drive. PrairieTek is most likely to sell the gadget to PC manufacturers, who in turn will be able to offer powerful 20 Mb portables which are hardly any bigger than less powerful machines.

The main worry for portable owners is that their machines take a fair bashing in a normal working day. Hard disk drives are notoriously fragile creatures and they don't take too kindly to being knocked about.

PrairieTek says it has this covered. When the power is switched off the read/write heads switch back to a safe haven away from the delicate magnetic plate (in much the same way as a record arm). Whilst stationary the drive can withstand a knock of up to a hundred times the force of gravity without losing data.

Hardware manufacturers will no doubt welcome the breakthrough. The hard drive costs a reasonable $400.

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NEW COMPUTER EXPRESS

COMMENT

Cracking Crime

The present fear over the spread of hacking is a sad but inevitable consequence of the spread of micros. Now anyone can afford one, and that includes the percentage of psychotics present in computer owners just as in the general population. Much arm-waving and table-thumping is currently going on as Mrs Thatcher is told that Something Must Be Done. But what?

Car theft is illegal, but that doesn't stop thousands of motors being taken every year. Likewise, criminalising hacking will not deter the determined computer crooks from their armchair robbery. It will only, say many hackers, bring prosecutions against a harmless comms enthusiast poking around who has the misfortune to be caught and tried in front of a computer-fearing judge ('A modem, Mr Smith?' 'Yes, Your Honour, a modem is device used to break into another person's computer using a telephone line...')

The way to beat car thieves is to make a car difficult to break into. No car is absolutely safe, but an alarm, centralised locking, carefully designed doors, steering wheel-clutch lock and so on make things very difficult for he would-be thieves, unless they have several hours to spare.

Many computers can be broken into with one password. But hacking into a computer you can take as much time as you wish; you just keep trying passwords with your special hacking programs. And getting into one often lets you into others straight away. Security should be much greater than it is: multi-level passwords, automatic alarms, verification routines changed daily, and no automatic gateways into other systems.

If the Government really wants to stop hacking, and not just lash out in technophobic panic at anything that dials on a modem, it must set up a similar scheme to the 'cracking crime' campaign (but preferably without those horrible kids) for organisations which operate on-line systems; perhaps draw up a list of security guidelines and offer free advice through a specially trained section of the local police. The people to stop hacking crimes are the very organisations whose security is presently so fragile. What they need is expert advice on how to tighten up their systems from the pros, not just fudged legislation against comms enthusiasts.

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PM WARNED OF HACKING DANGER

The Prime Minister is to be presented with a special report later this month warning of the increasing danger posed by computer hackers.

The report, compiled by Emma Nicholson MP, will outline growing fears for sensitive data such as air traffic control, chemical plants and hospitals. Many computer experts are becoming convinced that a hacker could spark off a catastrophe.

Nicholson is pressing for a Government Bill to be included in the Queen's speech this autumn outlawing the increasingly popular pastime of computer hacking.

"We must persuade the Government to make unauthorised access to computers a criminal offence" she said. "We can't afford to delay three of four years before the English Law Commission reports on the issue."

The report has been put together with the help of the British Computer Society as well as banks, police, hardware manufacturers and data security experts.

IBM's chief executive Tony Cleaver told *The Observer* newspaper this week: "Every month new instances become known. Computer misuse can and does compromise the security of society and the individual."

Computer security expert Martin Samociuk commented: "The biggest danger is that youngsters bungling around a system using a password to get in at a very high level could trigger a string of events which could cause a catastrophe.

"The motive may be intellectual curiosity on the part of a bright student, or mischief for an adolescent. But the knowledge being disseminated by these enthusiastic amateurs is coming into the hands of determined criminals with far more sinister motives."

Back to the Future

Yet another low cost 286 machine has been launched, bringing power computing closer to the home.

Future Computing's FS60 runs at 12 Mhz at a price busting tag of £1,096. A 30 Mb hard drive version costs £1395. More on 01 651 3541.

• Grand desings: Low cost 286 computing on the FS60

Lore and disorder

Microprose's *Times of Lore* on the C64 is experiencing loading problems and users are being urged to send faulty copies back to the software house.

The arcade adventure was sourced from Origin in the States. It seems that the master disk which was sent to the UK contained "a dodgy loader". MicroProse is to obtain a new Master and run out healthy copies of the game.

The firm is saying that the problem is one which only affects a small number of users. However, it would not say how many complaints had been received.

"This is a problem which happens from time to time. I just hope that users will send faulty games to us. We'll send them new copies with the new loader," offered a spokesman. MicroProse are on 0666 54326.

• In Trouble with the Lore: Loading problems for C64 owners

Computer could have saved Purley lives

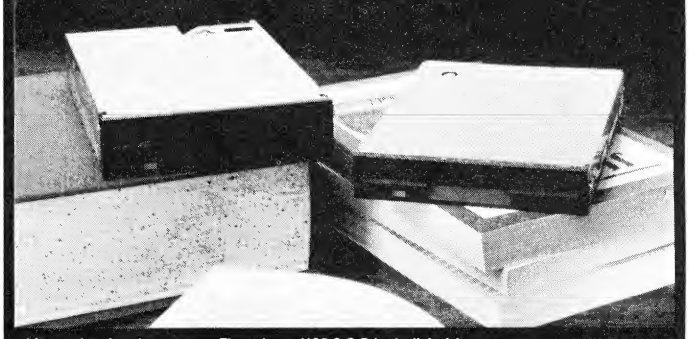
A computerised system due to be installed on the French railway network could have prevented the Purley train disaster.

The system provides a computer link between signals and all the trains on the line. A computer would be installed in the driver's cabin which monitors the speed of the train. If the data between the points and the train suggest he is going too fast then the brakes automatically come on.

As it stands in Britain, the system sounds a horn if the train is going too fast. Drivers, though, often override this by pressing a button. The computerised system would have warned the Purley driver to slow down. British Rail is looking at the new system but it is thought that the cost of kitting out Network South East alone could be as high as £200 million.

Swedish computer company Ericsson is one of the firms bidding for the contract.

Citizen's micro floppy



• It's not the size that counts: The minute UODC 3.5 inch disk drive

Citizen have launched what is being touted as the world's smallest 3.5 inch floppy disk drive.

Measuring only 2 cm x 10 cm x 13 cm the UODC features 1 Mb of unformatted storage capacity. Citizen hopes that portable manufacturers will latch on to the tiny drives. The small drives were achieved by designing a side mounting head. Space could be saved by repositioning the read/write mechanism.

"I'LL TEAR THEM LIMB FROM LIMB"

Bulletin board chief's fury at "childish" sabotage

The head of the London Embassy Bulletin Board has told of his anger at hackers who wiped out his bulletin board just for the hell of it.

Noel Bradford came home three weeks ago to find that the cruel hackers had accessed his 20 Mb hard disk and wiped out virtually everything. And, to add insult to injury, the mysterious group then accessed the back up disk and reformatted that as well.

A clearly upset Bradford told *Express*: "These are people with no brains and a sick sense of humour. I would guess that they're in the 14 to 15 age group. If I get some concrete evidence I'll tear them limb from limb."

Bradford is convinced that it was a group effort rather than an individual. He has already put out feelers around the bulletin board world with 'bounty hunter' friends tracking down the culprits. He said that he had an idea who the hackers might be.

"I'm just waiting for someone to start boasting," he fumed. "After it happened I didn't sleep for four days because I was trying to replace the missing data." The complete bulletin board was wiped as well as contacts, passwords and other vital information. The bulletin board has been running for eighteen months and, at one time, boasted a library of 2,000 Public Domain and Shareware programs.

It is an unwritten rule amongst the bulletin board fraternity that sabotage is not on. This is mainly due to it being easy, childish, and of no gain to the instigators.

RUSSIANS DROP BRICKS ON UK

A game from the Soviet Union is currently being paraded around British publishers .

The Wall was written by a Moscow based gang of programmers who are also members of the famous Gary Kasparov Computer Club. The team are hoping that a British software house will take the game on here. *The Wall* itself bears many similarities to Mirrorsoft's *Tetris* – also from Moscow – in that it involves logical management of bricks.

It's being represented by programmers agency Marjaq Micros in the UK. Boss Jacqui Lyons told *Express*: "It's a very simple game. Many of these Russian games are. They're very lateral thinkers over there." *The Wall*, if and when someone decides to publish it, will be available on the PC and ST.

The future arrives

An optical erasable disk system which can record as well as read data has been developed by Hitachi in Japan.

Optical erasable disks have been treated cautiously by the hardware manufacturers because, although their potential for holding data is enormous, they are said to be slow. However, Hitachi is adamant that its discovery is fast.

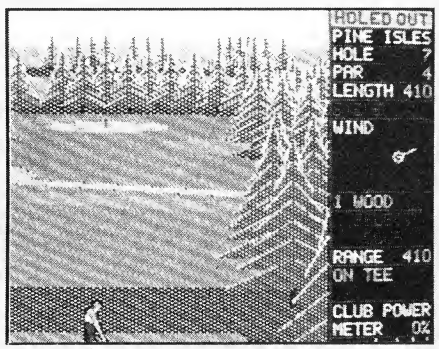
The advantages over today's magnetic media are enormous. Not only can optical erasables hold as much as fifty times more data than a normal disk but they are less prone to crashing.

Computer manufacturers will be receiving first batches of the Hitachi 5.25 inch in the near future at £2,500 a throw. UK availability will most certainly not be this year.

The biggest Beeb game since '86?

A small games software label has arrived on the BBC scene with big ambitions.

The Fourth Dimension's first release is a £15 golf game, *Holed Out*. The firm reckons 20,000 BBC or Electron users will buy the game over the next few months. Beeb games are doing very well if they attract 10,000 punters.



"This will outsell any BBC or Electron game since *Repton* in 1986," predicted the firm's Steve Botterill. "We've given the programmer a lot of dosh to do something good. Many good programmers who started on the Beeb have moved on to other things."

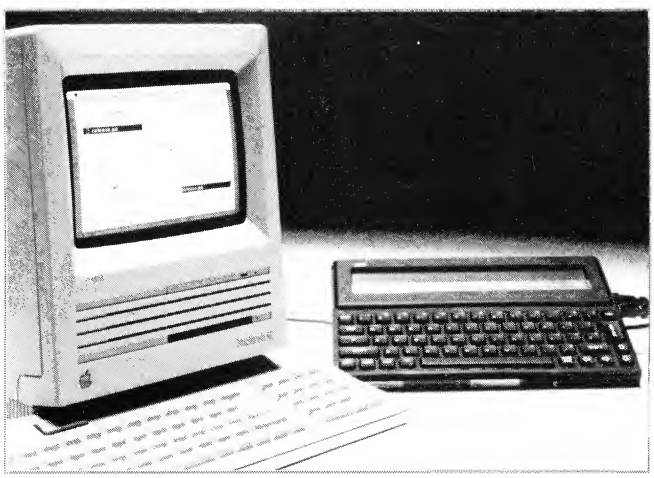
• Hole Story: BBC Golf game is driving for top spot

New portable for Mac users

Sir Clive Sinclair's Cambridge Computer is to offer Apple Macintosh owners a low cost portable.

The machine in question is called MacLite. But it is in fact none other than the beloved Z88 along with a fistful of bits and bobs. The machine is being bundled with Z88-to-Mac software and the relevant leads as well as a carrying case, batteries etc.

"There are currently an estimated 70,000 Apple Mac users in the UK and predictions are that this will grow by 100 per cent this year," said Cambridge's Alan Boxer. "They currently have no portable, we believe there's a significant demand for a low cost portable to use as an adjunct to the Mac."



• MacPortable: Z88 add-on to Mac

TOP 20 *Full Price* GAMES

1	Robocop OCEAN	*Spectrum, C64, CPC*
2	WEC Le Mans IMAGINE	*Spectrum, C64, CPC, ST, Amiga*
3	Operation Wolf OCEAN	*Spectrum, C64, CPC, ST, Amiga*
4	Emlyn Hughes AUDIOGENIC	*Spectrum, C64*
5	Dragon Ninja OCEAN	*Spectrum, C64, CPC*
6	Afterburner ACTIVISION	*Spectrum, C64, CPC, ST*
7	Thunder Blade US GOLD	*Spectrum, C64, CPC, ST, Amiga*
8	Falcon MIRRORSOFT	*ST, Amiga, PC*
9	In Crowd OCEAM	*Spec, C64, CPC*
10	Double Dragon MELBOURNE HOUSE	*Spectrum, C64, ST, Amiga*
11	Barbarian 2 PALACE	*Spectrum, C64, ST*
12	Batman OCEAN	*Spectrum, C64, CPC, ST, Amiga*
13	Giants US GOLD	*Spec, C64, CPC*
14	R-Type ELECTRIC DREAMS	*Spectrum, C64, CPC, ST*
15	Lineker's Hot Shots GREMLIN	*Spectrum, CPC*
16	Heroes of the Lance US GOLD	*Spectrum, C64, CPC, ST, Amiga, PC*
17	Football Manager 2 ADDICTIVE	*Spectrum, C64, CPC, ST, Amiga, PC*
18	Super Hang On ELECTRIC DREAMS	*Spectrum, C64, CPC, ST, Amiga*
19	Middle Earth MELBOURNE HOUSE	*Spec, C64, CPC*
20	Pacmania GRAND SLAM	*Spec, C64, CPC, ST, Amiga, MSX*

TOP TEN *Budget* GAMES

1	Treasure Island CODE MASTERS	*Spec, CPC*
2	Joe Blade 2 PLAYERS	*Spectrum, C64, CPC, BBC, C16, Electron*
3	World Games KIXX	*Spectrum, C64, CPC, MSX*
4	Werewolf MASTERTRONIC	*Spectrum, C64, CPC*
5	Int. Rugby Sim CODE MASTERS	*Spectrum, C64, CPC*
6	Ghostbusters MASTERTRONIC	*Spectrum, C64, CPC, Atari 8-bit*
7	Leaderboard KIXX	*Spectrum, C64, CPC*
8	SAS Combat CODE MASTERS	*Spectrum, CPC*
9	Knightmare MASTERTRONIC	*Spectrum, C64, CPC*
10	ACE 2 CASCADE	*Spectrum, C64, CPC*

RE re-entry • NE new entry • Last week's positions ↓
Compiled by Gallup
The charts shown are based on the Open Market, that is retailers who stock a broad range of products. All charts shown are copyright of Gallup.

Japanese computer work all in vein

A Japanese scientist is designing a new breed of computerised surgical instruments so small they can be guided through your bloodstream, performing surgery on the spot.

Professor Iwao Fujimasa of Tokyo University has been content up until now with designing two artificial hearts. Now, with the help of major Japanese electronics firms such as Hitachi, he has begun work on his revolutionary new designs. The instruments will measure just a few nanometres across – a hundred thousand of them would be the width of a full stop – to enable them to cruise around the body. This requires chips hundreds of times smaller than the smallest currently available (a few thousandths of a millimetre at present) but Fujimasa is confident that Japanese technology is up to the job.

He has prepared plans for robots which can crawl through the circulatory system and zap away unwanted organisms or tissues with lasers. 'Emperor Hirohito died of internal bleeding from his cancer,' said Fujimasa. 'With a microbot, you could have simply injected it into a vein and used it to stop the bleeding.' He expects to succeed before the end of the '90s.

TOP OF THE PC POPS

Amstrad, the darling of low cost computing, is becoming more popular amongst PC buyers in the UK.

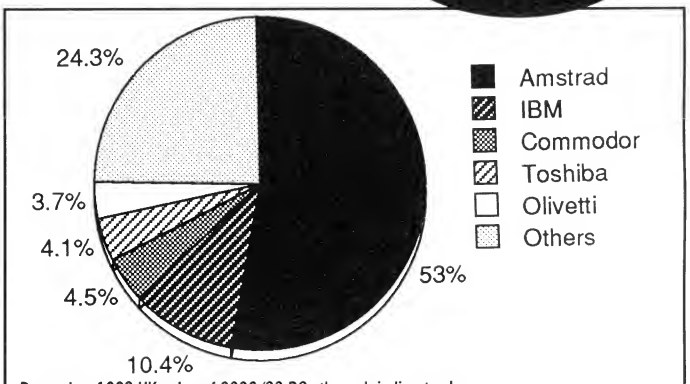
Figures sourced from market research firm Romtec suggest that the firm is selling more low cost PCs than all other manufacturers put together – an impressive 53 per cent slice of the PC pie. These figures cover the month of December 1988 and relate to sales through dealers. Amstrad had a 44 per cent share of when Romtec tested the market in June last year.

Amstrad's increasing lead is even more impressive given the firm's concentration on moving up market and the well publicised shortages. The news will bring a smile to Amstrad faces after months of setbacks and disappointments such as the recent financial results.

IBM, traditionally Amstrad's main threat in attracting the low cost PC buyer has slipped behind somewhat. That firm's share dipped from just under 20 per cent to 10.4 per cent. IBM's recent price restructuring in the low cost area will no doubt recover some of the lost ground.

Figuring it out

Demand for PC software is still on the up and up. According to the Software Publishers Association, PC owners bought 40 per cent more software last year.



December 1988 UK sales of 8086/88 PCs through indirect sales

Mac hacker cracks marijuana pusher

A London drug dealer has been jailed for eight and a half years after customs officials hacked into his Apple Macintosh and discovered details of how his unsavoury profits were being laundered.

The cannabis dealer – Ronald French, 37 – had kept details of 14 companies on the Mac under an "unbreakable password". The one time rag and bone man is a keen Country and Western fan, his password was the name of the song "Blanket on the Ground".

The officials broke into the computer and found 14 companies listed in such countries as Switzerland, Panama and Liberia. All the companies had been used to launder the money. Such was the size of French's computerised operation that the court saw fit to strip him of £1.7 million in assets.

DATAWORLD

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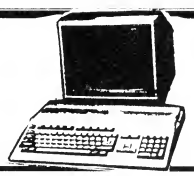

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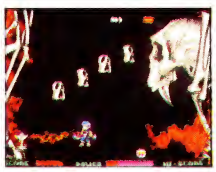

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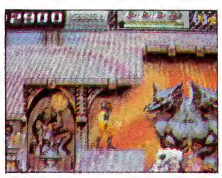

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PS. Sorry, we just don't have the time to give personal replies, whether you include an SAE or not. We're too busy putting Express together!

WHICH PC VOL. 261

I write to you with the utmost urgency, I am a student at a Polytechnic and I have decided to buy a computer for my study and on which my younger brothers can play games.

I have decided upon two options:

i) Atari ST: Can I obtain a good Pascal package which I can transfer on to my Poly's IBM PCs?

ii) Any PC: Can you recommend any good PCs? (Bearing in mind tight student budget!). Can my TV serve as a monitor (with or without modulator)? Specs: – 5.25" Disk Drive, IBM compatible (MS-DOS).

A most detailed answer would be much appreciated. Thank you in anticipation.

By the way, what do the terms DD, SD, etc stand for at the end of computer names?

Umair Malik, London

● ***I assume you want to be able to write a Pascal program on your ST and take the disk with the source code on it to a PC and use it there. You can do this (so long as your 3.5 inch disk has been formatted on the PC). Try HiSoft on 0525 718181; they have good implementations of Pascal.***

For your uses an Amstrad PC1512 or 1640 is fine (though not as good a games machine as the ST!). Shop around for the best deal at Comet/ Dixons/ Currys etc.

DD means double drive, SD single drive.

SWEET COLUMN BIND

You appear to receive a lot of demands for machine specific columns which are not catered for, like the Atari 8-bit.

Would it not be a good idea to include columns on these machines simply when there is enough information to warrant them rather than sticking rigidly to the same machines each week? Perhaps you could alternate each week say, MSX and Atari 8-bit?

I don't at present have a computer but maybe you could start an Aberdeen supporters column?

Barclay Thow, Aberdeen

● ***Important news about any of the machines not covered in the columns would go in the News section (Show details and so on). There are already as many columns as we can reasonably support in a mag of this price (people don't write them for free, you know!) and to start alternating one with another, or introducing irregular ones, would quite honestly be too much trouble. Sorry!***

MSX MANUAL

I am very pleased to see a magazine that includes MSX. I have a big problem. I bought my MSX off someone I know. I have not got a manual for it and would dearly love one. Could you or one of your readers let me know how I could obtain one? I am at my wits end. It is for a Sanyo MSX 64K Model MPC-100. Service ref. NO MPC-100-01. Looking forward to next weeks mag.

Robert Hudson, Pontefract, W Yorkshire

● ***Try Sanyo's spares department on 0923 222244. They still have a few programming manuals (part no. 3-P02813) for £18.18, but have run out of user manuals. Anyone out there in MSXland help?***

READERS, WRITE!

How about having a 'readers reviews' section, either in with the main reviews or in the 'your machine' columns? Also how about a page of hints and tips on the latest and best games?

David Deans, St Albans, Herts

● ***Hints and tips on the latest games go in the machine-specifics, which is one of the reasons why they're there. As for readers doing reviews, er, yes, um, most imaginative and, ah, interesting. Don't ring us.***

HAPPY EVER AFTER

I read with interest the letter from P Bennett (But The Amiga Hardly Ever Cra...) in Express 17. It is an all too usual tale of suffering, inflicted by many computer dealers. However, my story is a happy one.

I bought an ST in January 1989, from Silica Shop (who also sell the Amiga). the machine worked fine for about a month when it suddenly stopped accepting mouse input, then the keyboard failed. I returned the machine under Silica's replace/repair guarantee. They repaired the machine and returned it within a week. But the machine failed again two weeks later. It was duly returned, repaired and returned this time within ten days. Three weeks later it failed for a third time and was returned and repaired. By this time I was becoming increasingly agitated by the machines inability to function for more than a couple of weeks.

Inevitably it failed again, within weeks, so I contacted Silica to let them know what had happened up until then. They accepted the fact that the machine must have had an inherent defect, and replaced it (even though it did get lost for a while by the Post Office) bundling several top titles with the replacement. This was an act way above the call of duty as I had owned the machine by that time for over six months, and they were not legally bound to replace the computer. So many thanks Silica, the initial problem was not yours, but you handled it admirably. By the way, the machine has now served me without a hiccup for over eight months!

K Coward, Lancaster

● ***A pleasant reminder that the majority of mail-order companies are perfectly honest, businesslike and fair. Like used car dealers, they must get well hacked off with the complaints about the odd rogue here and there which reflects badly on the rest.***

CONFESSIONAL

OK, I'll come clean. Yes it was me (Express letters last week) a mere spotty faced 16 year old who goes to Raynes Park. Ten out of ten for your detective work.

I suppose you feel pretty smug, eh? Well let me warn all you at Old Commuter S-Express that there is a Network Virus at Raynes Park see PCW Feb 9-15 and it is spreading. What's that – is that your smile slipping or do you always look like that?

So you sexist tossers (you assumed it to be a male who wrote the letter) I've got news for you.... er, well I will have and very soon!

By the way – have you got the results back from Bristol Police's Forensic department? Please publish them when you do!

The Beeb Bandit, South-West London

● ***Yawn. See this week's* Beeb Box.**

THE CLASS OF Z88

I think your magazine is excellent. The series written on Alan Sugar was in my opinion top class journalism by any standard. I also did like the way you dealt with the correspondent who praised your magazine and another in the hope of getting a prize.

There are however, two points that puzzle me about the information I have been able to glean week by week:

1 Why do you not have a machine-specific column for the Z88?

2 There must be a good reason why you do not rate the Amstrad PC1640 the best on the market for its price. I think I have read all the articles including Which PC in Issue 14, but I still cannot see a PC to match it where price and specification are paramount.

Maurice Baker, Leatherhead, Surrey

● ***The Z88 is a nice little machine but there is very little software for it (one database and one comms package at the last count) very few products coming out (most of them***

NOT THE SIZE OF YOUR CHOPPER

MYSTERY PRIZE WINNER

I agree heartily with Tim Gowen (Letters, Express 17 'Why the PCW is better than the Amiga.'). I, too, live in the hope that one day we might see an end to all this computer 'X' versus computer 'Y' nonsense, but it's probably a forlorn hope. The drooling teenage techno-junkies will never understand that as far as home computers are concerned it's the quality of the programming that counts, not the theoretical capabilities of the machine.

As an extreme example, I have 'Winter Events' for the Commodore 16 and 'Winter Olympiad' on the Amiga – both very similar games. Now, the C16 is obviously vastly inferior to the Amiga but, amazingly, the C16 version is far superior in playability, and the graphics are just as fast if not as detailed. It gets played in preference to the Amiga version any time, so am I wrong? Is the C16 the better machine after all? Of course not. 'Winter Events' was simply written by a better programmer, or at least by one who knew his or her machine better.

I can see this letter getting the 'Salman Rushdie' treatment from some quarters, but I don't care. Contrary to my resolution (which you published!), I recently bought an Amiga. It's a wonderful machine and I love it, but I don't kid myself that it makes me a member of some elite – except in the sense that I'm lucky enough to be able to afford one. It's only as good as the person using it, and I know that a really good programmer could achieve more with a Spectrum than I can with my Amiga at present. As Prince Andrew might say – 'It's not the size of your chopper that matters, it's the way you fly it...'

Stephen Mercer, Shaftesbury, Dorset

● ***Similarly, David Bailey or Helmut Newton can take good photos with a Box Brownie instead of a Canon or Olympus; Julian Bream can interpret a piece as well on a Woolworth's classical guitar as on a Ramirez; Nigel Mansell can drive a Ferrari or a Metro and still come second.***

Anyway, for a good dose of common sense we think you ought to get our mystery prize – some software for your PC.

NO MSX PLEASE, WE'RE 8-BITISH

I hope you will print this letter as this is the fourth draft. If you don't I'll tell the Ayatollah Khomeini that Mr Rushdie is hiding in your offices.

1. I want to buy an Amiga but Nigel Lawson won't let me. Can you print a full page picture of him so that I can stick it down my toilet.

2. Is there a voice editor on the Amiga for the Yamaha DX100 Synth. If so, how much is it?

3. How about inbuilt virus killers instead of laborious annoying copy protection routines?

4. Legalise piracy and you will get rid of it overnight ... just like CB radio.

5. Virus writers should by flogged, publicly. Although you've got to admire them in a way, just like the great train robbers. But then again, maybe not, more like Typhoid Mary.

6. Can we have less pictures of Alan Sugar?

7. Will I be MSXtremely unpopular by saying that there are more Atari 8-bit owners than MSXers. Not that it really matters.

8. We threw away our AMSTRAD PCs at work and bought TANDON PCs instead. This was because they:

a Were rubbish
b Had bits missing
c Broke down a lot
d Corrupted DAT@!*R

9. After all the serious stuff can you now tell me why years ago I bought an Oric Atmos for £139.99? The only reasons I can now remember are

a It looked beautiful
b Had an excellent BASIC and
c I thought I could write games.

I've still got it, it's still crap, but I love it!

And finally (although I feel I could write a book right now) here are some anagrams produced with the aid of the finest computer made to date...the Human Brain v1.0:

New Computer Express = Excrement wop supper
Neil Barnes, Birmingham

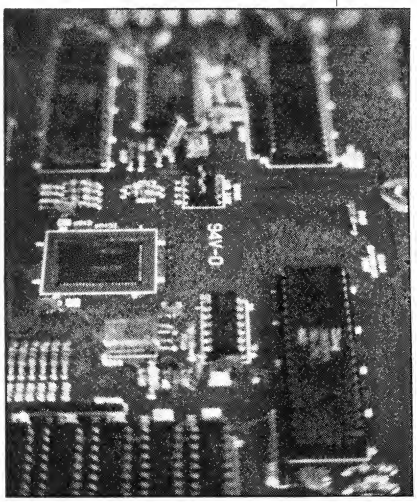
● ***Er, here goes. 1. No – it might block your toilet. 2. MCMLXXX distribute Dr T voice editing software though it's around £100. Try them on 01 724 4104. 3. How about them? 4. I doubt it. Software piracy is effectively legal in Iron Curtain countries and it hasn't stopped them at all. 5. Well, yes, just like you'd admire Dr Crippen for being good at Chemistry or Lee Harvey Oswald for being a good shot. 6. You mean fewer pictures. Yes. 7. Yes. 8. The views of this correspondent do not necessarily reflect those of the editor. 9. Is this a riddle? I give up.***

Your anagram doesn't work (and we couldn't print the Nicholas Ridley MP one as it was libellous). Surely there are only two letter ps in our title? How about 'women expect purses'?

• Let's have fewer pictures of Alan Sugar, says Neil Barnes

MEMORIES LINE THE CORNER OF MY PCW

I read with interest in 'Computer Express', Issue 17 dated 4th March that it is possible to obtain a standard memory upgrade for an Amstrad 8256 at a cost of £20.



• Thanks for the memory: upgrades on a PCW (Memories line the corner of my PCW)

This information was contained in an article by Basil Pigg under the title 'The Mega PCW'. This was surprising to me as the only upgrades I have seen advertised have been priced at around £55 or so.

It has been my intention to try an upgrade for the very reasons mentioned in the article so would you be good enough to let me know who produces such an upgrade at the price mentioned?
Dennis N Duro, Westbury, Wilts

● ***Sorry, it was a bit misleading. The standard upgrade is as you say £55 or so (try Silicon City on 0209 891141 – they also do B drives). The £20 refers to the price of chips bought in an electronics shop and fitted entirely by yourself (no instructions of course).***

Locomotive now recommends the normal 256K memory upgrade as a matter of course for the 8256. And, by the way, they stress that you don't need the 1 megabyte memory to use LocoMail/ LocoFont/ LocoFile together – as the article stated, you would only need it if you use those three simultaneously with LocoSpell too.

FLOW OF ELECTRONS

I was interested to read the letter about the Electron (Ish 17) hardware scene. Although mine packed in months ago I still read Electron User and there are several companies that still build add-ons for the Elk.

Try Slogger (0272 237496) for various add-on bits, such as the Master Ram Board (£49.95 – Kit), which gives the choice of either BBC speed or an extra 32K RAM. They also do repairs and sell various ROMs (Disassemblers etc).

Pres (0272 72046) sell the same sort of things and still stock their own versions of the Acorn interfaces (Plus 1 + 3). You can also get hold of the Music 5000 Synth for £113.85. Most BBC bits are available but you will probably need a Plus I or User port to run these.

You can get a 64K Electron for as little as £100, which makes it a bargain way to learn BBC basic. Check out Software bargains (0532 687735 or 0532 687789) for re-conditioned Electrons selling for £60 and some cheap hardware packs (Plus I, Acorn Logo, Viln, Viensheet + lisp on ROM for £117.45 – not bad value I must say).

By the way, Spectrum 48 owners who want to go mad should take a look at Galaforce, Kissin' Kousins, Frak and Impossible Mission (as well as others I could go on about). No colour clash there! Hope this helps.
Robert Henderson, Liverpool, Merseyside

● ***Thanks for the info – hope Electron fans find it useful.***

DRAGON ON AND ON

I am writing about two things. The Dragon 32 and the GCD (great computer debate).

Firstly I own a Dragon 32 (remember those?), and I think if is one of the easiest and user-friendly computers to work with. For a tester, its merits are:

1 It has a useful reset button that doesn't reset the RAM, it literally resets the game back to the beginning.
2 It has cartridge capacity.
3 It works well as a WP.
4 It has good graphics.
5 It has extension parts for everything except MIDI (just about).

The question is, why did it die out? Anyway, back to the GCD.

As a (possible) end to the GCD, and proof of how mad everybody is here is the list to end all lists:

The C64 is superior to the Speccy, but punters generally prefer the Speccy.
The Dragon is far superior to the BBC, but the Dragon became extinct.
The Amiga is superior to the ST, but more people program and buy STs.
Amstrad is basically a big bucks quick firm, but people still buy from them.
MGT is the best hardware mail order company, but virtually anyone I asked hadn't heard of it (even within the Spectrum), and finally
Special Reserve is the best and cheapest software mail order company (my games came 2-3 days after I sent my cheque), but punters are still sceptical about Jocky.

If you want cheering up, then read clue 441 of the Gnome Ranger's clue sheet.

And, finally, adventure games are played a lot because of the sense of achievement gained, for example the 'oh, of course, how stupid I've been' feeling when you suddenly realise how to pass a certain area or puzzle, and arcade games are played for the sense of power and superiority experienced (Express 16).
James Handley, Barnes, London

● ***Why are things born, why do they die? I don't know, it's the way of all things. If someone knows what clue 441 of Gnome Ranger actually is, please tell us.***

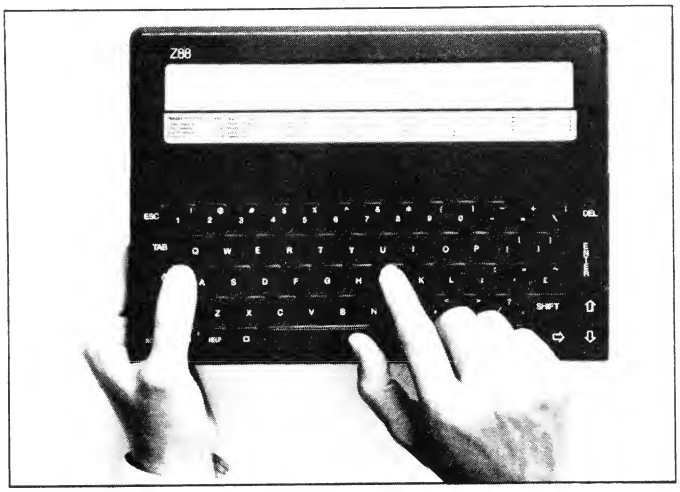
PSION OF THE TIMES

Why don't you have the occasional piece in the mag about the Psion Organiser? There are a lot of us about and we're growing!

Please pass on our congratulations to whoever on your staff wrote the piece on the new Atari PC on page 54 of the most

being linkup systems to other machines like the Mac) and not a very large user base (most of whom have other machines covered in the columns anyway, making it an uneconomic investment for us in terms of extra readers!). For the time being I can't see it, though of course we constantly review the coverage of the machine specifics. Maybe the new price cut on the Z88s will provide a boost in ownership?

The Amstrad was the best for its price but a number of newer PCs are coming out for the home or small business user such as the Commodore PC1, Schneider Euro PC and so on. Many people feel the Amstrads are a bit clanky and built down to a price rather than up to a specification – see the final point of the 'No MSX please' letter.



• Is the Z88 worth a column? (The class of Z88)

recent Express (issue 17). I read it out to my wife in the car as we were travelling to London and we thought that it was one of the most amusing pieces that we have ever read. Keep up the good work!
Jeremy Holt (Chairman SPOUG), Swindon, Wilts

● ***Thank you very much. We'll, er, give serious consideration to Psion Organiser articles.***

NOOKIE HOLE

After flicking through many glossy magazines, my colleagues and myself have still not been able to locate a stockist of the much flaunted 'nookie' games, Teenage Queen and Emmanuelle and so on.

Due to excessive use of Anglo-Saxon expletives in my general direction, I am forced to ask you for possible stockists. A prompt reply would be greatly appreciated, as our investment in toilet rolls is blocking the stairs.
R M Johnson, Guildford, Surrey

● ***Well, you can find them in the mail order ads of* Express.**

I am thoroughly dismayed that no feminists (m/f) have written in to complain about our reviewing programs like this. Have they given up computer gaming as a bad job, irreparably shot through with stereotyped thinking? I hope not.

TO A T

First, I must thank David Carter in his letter in issue 16, for indicating a use to which I can put my QL, after I downgrade to a 386 PC. It will certainly be more comfortable than the Transform Keyboard Spectrum currently used for this purpose.

The main reason for writing to you, is with reference to the *PSsst!* User Instructions on Tea Making Challenge.

I was very surprised not to see a contribution from the most proliferate author on the subject of Home Tea Making, namely, Miss Niai Clair Sin. It is generally agreed that her best work to date, is on the subject of Lap Top Tea Making, entitled, 'Home Tea Making with the Goblin Teasmade & Compatibles', now in its 10th Edition, and which has been translated into 34 languages.

For the TM professional, the Hardware manuals supplied with ITM machines are excellent. The most famous Tea Packages are Ashton-Tea TBase IV and Lotus Blossom 1-2-Tea.

Until recently ITM was the standard choice for corporate TM Departments (It is well known that no-one was ever sacked for buying ITM).

Now, however, the new parallel Tea Makers based on the incredibly powerful INTMOS CTMUs are beginning to make a real impact. A prototype at the Which Tea Maker Show was able to make 96 different teas simultaneously, and serve over 800 remote TPUs, with sub 1 second response. Conservatively rated at 1600 CPM, this machine represents the first major step forward in Tea Making for 10 years.

With extreme cynicism
Douglas Ian Holland, Crawley, West Sussex

● ***Now I brace myself for the requests for a Goblin Teasmade column...***

• Teenage Queen: What's her hair dryer doing blowing that way? (Nookie hole)

SNIPPETS

A PEEK IN A POKE

How do you put something in memory and get it back out again and if so will it stay in if the computer is switched off? I've got a C64.
Lee Emmery, Nailsea, Avon
POKE, PEEK, and No.

NEW TITLE?

When will you drop the 'New' in your title?
Kevin McGahar, Belfast, Northern Ireland
We can't drop it as there is a computer stockist called 'Computer Express' – nothing to do with us except that they advertise in our pages a lot.

PCW PATCH: ONE AGAINST

Drop the PCW column, it is so dull.
Neil Barnes, Birmingham

...AND ONE FOR

My main interest is in Amstrad PCWs and IBM compatibles and the coverage you provide is brief, accurate and very much to the point in the Your Format section.
Maurice Baker, Leatherhead, Surrey
And my casting vote is for. So it stays.

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Viruses

How safe are you? Despite frequent shock-horror stories in the press, viruses are not the computer equivalent of biological viruses they are made out to be. Jerry Glenwright cuts through the hype and gives you a healthy dose of common-sense...

You're cataloguing some files using a utility your friend gave you. Suddenly you think you see a character in the top left hand corner of your monitor break into small pieces and crash to the bottom of the screen. Must buy one of those anti-glare screen covers, you think to yourself, put it down to eye strain and carry on. Within minutes, it's happening again. Gradually all the graphical display 'breaks' into tiny pieces and falls to the bottom of the screen, and your computer locks up. When you start up your computer again, all your data has gone. Wiped clean. Irretrievably.

Nowadays, the above can be an all-too-familiar scenario. Hardly a week goes by, without the popular press reporting some new disaster from the computing world, involving that most deadly of the enemies of computing: the virus.

'Large corporations the world over are living at the edge of total collapse as the insidious fragment of code burrows its way into their computer systems, destroying everything in its path. This fatal fragment of fury, unleashed from within the depths of some demented hacker's perverse and twisted mind, threatens AIDS-like to destroy...'

Could this potential for dramatic journalistic treatment be part of the reason for the incredible publicity given to viruses during the last six months?

As with any item of popular news, there is a modicum of truth. The computer virus does exist (though in 18 months in the computer industry, I've never seen one). It does replicate itself, writing these replicants to your disks, until one day some condition is met and you are made aware of its presence. But it is not nearly as widespread or dangerous as the tabloid press would have us believe. It is relatively easy for the novice as well as the more experienced hacker to get rid of, and several steps can be taken to insure against its appearance in the first place. If you own a machine like a PCW, CPC, Spectrum or C64, you are extremely unlikely ever to encounter a virus – it's the ST and Amiga owners and the PC and Mac users that should be on their guard.

The virus is just a computer program: the cousin of the program that corrects your spelling and allows you to process words and play games. The difference with this program is that it is written with the express intention of doing something unexpected or damaging to your system. It takes several forms, and its results can vary from the relatively innocuous (such as a silly message or changing the colour of your screen), to the trashing of your hard disk, with the consequent loss of all your data (although even in these extreme circumstances you may still be able to retrieve vital files).

Who writes viruses? Some started as jokes and do harmless things like scatter slugs over the screen which move over it, leaving a slimy trail. Others were originally devices to stop pirate copying: one example has been the 'Brain' virus which originated in Pakistan and has spread to America. It started as a harmless messaging routine but some hackers have altered its makeup so that different 'strains' of the same routine have been

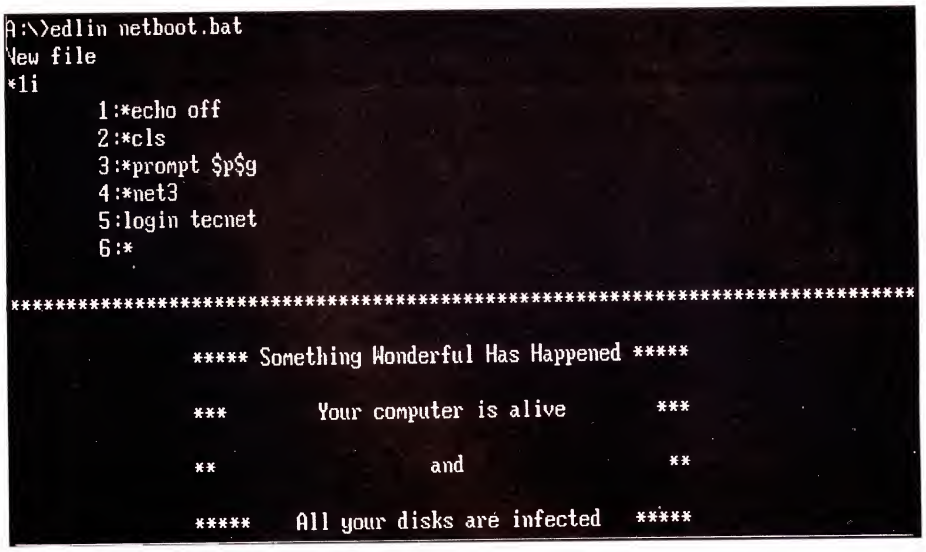
☞

reported to trash hard disks.

Sacked computer programmers have been known to write viruses to get back at their former employers, and many viruses now are being written for fun as a nasty kind of computer vandalism. Rumours have been circulating of a virus writing kit available in West Germany to help prospective vandals, as reported in Express (issue 14).

What boots it

Consisting of just a few tens of bytes of code, the virus is a very small program which is hidden away on a disk: as difficult to find as one sentence in a book. On almost every disk, there exist areas needed by your disk operating system, to access and use the information which is stored on the disk. For example, the boot sectors, which contain a machine code program which loads the software stored on the disk into the correct memory addresses of your computer, and start its operation. These sectors are read every time the machine is booted. Then there are areas such as the file allocation tables, telling the disk operating system how big your files are, their names, and their whereabouts on the disk.



• A virus at work on the PC

Day in the Life of...a Virus

Eric is a keen home computer buff. Each evening he is to be found at his machine, computing the home accounts and logging-on to bulletin-boards.

During a typical session on-line to his favourite bulletin board, Eric notices a filing utility, which appears to be just the thing he needs, in order to organise his growing collection of files on floppy disk. He down-loads the utility from the board, but, because of the late hour, he decides to wait until he goes to work the following day before trying it out...

9:00:00	Eric arrives at his office.
9:03:00	Eric boots his machine into the office PC network, and logs in.
9:04:00	Eric inserts the disk containing the new utility into his machine.
9:04:35	The utility is up and running, but, unknown to Eric, so is the virus he unwittingly down-loaded with it the night before.
9:05:50:45	Eric inserts the first disk to be sorted into his machine.
9:05:50:48	The virus exines the boot sectors of the new disk to determine whether or not it has already copied itself to that disk.
9:05:50:49	Discovering that the disk is free from infection, the virus writes an exact replica of itself to the disk.
9:07:50:49.5	Eric carries out a disk directory listing of the disk, completely unaware that a fraction of a second earlier, it was being examined by the virus.
10:05:00	Eric has completed the sorting and filing of eight disks, each one now infected by the virus.
10:30:10	Eric joins his friend Rita for coffee.
10:33:10	Eric informs Rita of the wonderful new utility. He tells her that it will solve all of her disk filing problems.
10:45:25	Back at Eric's machine, Rita makes a copy of the utility, so that she may use it at home.
10:45:25:08	The virus infects Rita's disk.
11:05:00	Ron, overhearing the conversation between Eric and Rita, decides to take a copy for himself.
11:05:00:08	The virus infects Ron's disk.
11:45:00	Ron has infected eleven of his own disks, with the virus ridden copy of the utility which he took from Eric.
11:46:00	Ron discovers a disk which he missed during his filing operation. He inserts this disk into his machine.
11:46:00:08	The virus infects the new disk and in so doing, completes its life cycle of the infection of twenty disks.
11:48:00	The virus announces itself and begins the systematic destruction of the host system, starting off by wiping clean all the customer data on the company's network hard-drive...

It is very easy for the would-be virus programmer to add (or 'patch') an extra few bytes of code into one of these areas. This then acts as a pointer (the computer equivalent of an 'Advance to Mayfair' card) to the virus routine stored elsewhere on the disk, which loads itself into the memory of the computer. Once this task is completed, control can be returned to the operating system. These operations take a very small amount of time, perhaps a few tenths of a second, and so your suspicions are not aroused.

Once the virus program is resident in the memory, it will sit in the background waiting for you to insert another disk in the drive. It then checks the relevant areas of the disk, to see if a replica of itself already exists. If not it writes out an exact copy of itself, infecting the new disk. Soon, all your disks will be infected. Then, at some predetermined event or time (when five copies have been made and the virus has safely propagated itself, or when the date reaches Friday the 13th for example) you will be made rudely aware that you are a victim of computer virus.

And that's it. No magic, no sinister happenings; just a small piece of software doing what it's been programmed to do. Once in the computer, the virus does not stay there forever. It cannot remain in the memory of your computer once the power supply has been removed. It cannot infect other disks by keeping them together in the same box, and it isn't transmitted via the air or human fingers!

You must, however, be aware that it can infect your disks! Don't think that it can't happen to you, because unless you take precautions to ensure that it doesn't get to your software, it will. And although it is perfectly possible to eradicate a virus from infected disks, better that you don't have to try.

Practise safe hex

The cardinal rule is to write-protect all floppy disks whenever possible. A virus cannot write a copy of itself to a write-protected floppy disk. The simple application of the write-protect tab is enough to stop even the most terrible virus in its tracks. Make a back-up copy of all unprotected software and use the copies. Be very careful when you buy or otherwise receive public domain software; it is the single largest method of transmission for the virus. You will be unlikely to find a virus contained within commercial software. The software houses are very careful to combat something which may rob them of their trade, although this is not to say that it doesn't happen. If you

Technobabble

Viruses

Boot sector
The instructions on disk telling the computer how to start up when you switch it on; how to load the operating system and so on. The process of booting up is like getting dressed in the morning: what you take on then is with you for the rest of the day. Boot sectors are a favourite hang out for viruses.

Bulletin Board
Computer which can be accessed by people to download software from: they can be anything from hobbyists' private computers to large companies' information services.

Downloading
Copying a program or other file from someone else's computer onto yours via a cable or phone link.

PD (Public Domain) Software
Software free of copyright which may be copied and given away freely. A notoriously popular breeding ground for viruses.

Trojan (Horse)
A program that looks useful – a utility or game – which actually contains a virus and is a sneaky way of getting it into your system.

Vaccine
Program or group of programs that provides some kind of protection against computer viruses, or detects their presence enabling you to trash the offending disks (and use the back-up copies you took instead).

Virus
Malicious program which causes damage to your data or does something unexpected when a predetermined condition is met and propagates by copying itself to other disks.

Worm
Malicious program that moves through your computer (inserting garbage in your text files perhaps). It doesn't usually copy itself to other disks as a virus does but just 'worms' its way through your system, so is found in networked systems rather than individual micros.

purchase your public domain software from a reputable supplier, then they may be using some method of checking the disks, and they will usually advertise this fact.

Bulletin boards, because of their inherently interactive role, are prime targets for the distribution of the computer virus. Be very careful when using any utilities or games that you download during a session on-line. Often, the virus may be disguised as a patch to cure a bug in some other piece of PD software. If you're using the software and haven't encountered the bug, then don't use the patch: what purports to be a cure may, once used, need a cure itself. Try to limit the amount of disks you swap with your friends. Although you take extra care with your disks, they may not.

If you want to examine disks more closely for the presence of a virus, then use a sector editor. These are programs which allow you to make a more detailed inspection of just what is on a suspect disk. Turn on the ASCII dump function and search through all the files on the disk, for messages such as 'Something wonderful has happened', 'Now trashing hard disk', etc. You may not be able to see where the virus code starts and where it ends, but at least you know that this disc is probably infected, and can revert to your backup.

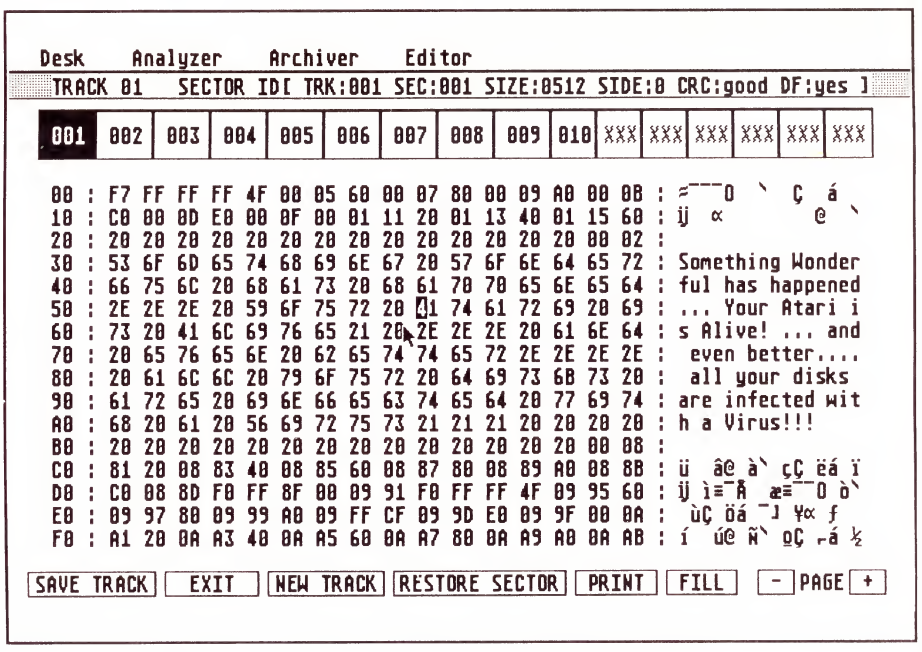
You can also use the sector editor to examine the system areas for extra bytes as described earlier. You must exercise caution when making this kind of search, as a mistake may lead to your software being rendered unusable.

Hooray it's the vacs

How about a vaccine? These are utilities which will track down and 'kill' any virus which may be lurking on your disks. By examining the bootstrap loader code and file allocation areas, they are able to identify rogue code. They will then prompt you as to whether they should hand over control to the software on the disk, or delete the suspect code and 'cure' the disk. They are available from the public domain, as well as commercially, for most formats.

Finally, if after taking all precautions, you find yourself a victim of the dreaded virus, then make like a hitch-hiker: Don't Panic. Turn off your computer and wait for several seconds before switching back on. Examine the offending disk. Do files still exist? If so, are they legitimate files? If the disk is a copy, compare the files with those of the original. Do the byte sizes of the files correspond? If not, then they may have been changed by the virus, and it may be wise not to use these files again (unless you can examine them with a sector editor and recognise rogue bytes). If the byte sizes of the files do correspond, then copy these files to another disk, and format the corrupted disk. If files have been deleted, you may still be able to retrieve them using one of the many 'un-delete' utilities available. If the disk is completely corrupted, then at least you were using a copy and still have the original, don't you?

Remember: the home or small business user is far more likely to be the victim of media hype than virus corruption.



• Viruses can often be spotted in the middle of a program by text messages like this that display on

The World of Viruses

Though many hundreds of viruses have been written, many of them whimsical and harmless (one early example in a mainframe printed 'Happy Birthday Ludwig' on screen on Beethoven's birthday) a few are more destructive. Here are a few examples of the sort of thing you may find yourself up against.

The '1813' virus
A virus supposed to have spread widely around PCs in the City, taking its name from the fact that it was 1813 bytes long. It was set to 'go off' on Friday 13th, wiping clean all disks and hard disks on any computer using a disk infected with it on that date. Despite widespread publicity only six cases of it doing so were reported.

The 'PLO' virus
This caused the computer it was on, in the Hebrew University in Jerusalem, to slow down to one fifth of its speed. It was caught before it could achieve its purpose of destroying all the files on the computer on Friday, May 13th 1988 - the 40th anniversary of the last day Palestine existed as an independent country. The perpetrator was never found but its nature led it to be dubbed the 'PLO' virus.

SEX.EXE
A Trojan Horse American PD program which let you watch pornography on screen, but whose main purpose was to infect your PC with a virus which corrupted your disk after replicating itself to others.

Byte Bandit
An Amiga virus. After a random amount of time it blanks the screen. The screen is recoverable by pressing the left ALT key, the left Amiga key, the space bar, the right Amiga key and the right ALT key, in that order. (The virus emerged recently on certain versions of the game 'Wizball' but versions bought now should be OK).

As Easy As...

What does a virus really look like? How does it replicate itself, and write these replicas to your disks?This routine, sneaked into a normal program disk somewhere, will copy itself to all disks used on your machine and will burst into life, wiping the hard disk, when it has parented twenty offspring, or when it's Christmas Day (whichever is the sooner).

The virus begins by initialising two control variables, which it uses to determine whether or not it's time to 'wake-up'.If neither of these two conditions have been met, then it will check each disk inserted into your drive, writing replicas of itself to those which are not already infected

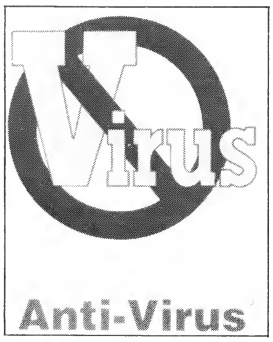
Prospective hackers should note that it's written in a language which is plausible but nonexistent so cannot be used or adapted to make a real virus!

```
Main_routine:
    Var drive_num; copy_count; THE_DATE;THE_COUNT;
    THE_DATE="25:12:89"
    THE_COUNT=20
    if sysdate=THE_DATE then_
        sub screw_system:_
        end
    copy_count=0
    drive_num=1

Drive_test:
    if drive_num>0 then_
        go disk_test_
    else    sub to_sleep
        drive_num=1

Disk_test:
    Var disk_in_drive; already_infected;
    Var bootsec_byte_cnt;actual_byte_cnt;
    bootsec_byte_cnt=(normal boot sector byte size)
    already_infected=0
    disk_in_drive=examine(drive_num(relevant memory location))
    If disk_in_drive=0 then_
        if examine(more_drives(mem loctn))<drive_num then_
            drive_num=drive_num+1:_
            go disk_test_
        else    drive_num=0:_
            go drive_test_
    else    actual_byte_cnt=val(examine(disk(boot sectors)))
    already_infected=mod(bootsec_byte_cnt/actual_byte_cnt)
    if already_infected then_
        copy_count=copy_count+1:_
        if copy_count=THE_COUNT then_
            sub screw_system:_
            end_
        else    drive_num=drive_num+1:_
        go disk_test_
    else    sub infect
    drive_num=drive_num+1
    go disk_test

Infect:
    write(disk(boot sectors(virus)))
    copy_count=copy_count+1
    if copy_count=THE_COUNT then_
        sub screw_system:_
        end
    return

To_sleep:
    repeat
    scan(floppy drive(drive_num))
    until (disk(inserted))
    return

Screw_system:
    Var format_disk;
    format_disk=(hex value for op)
    assign(relevant mem location),format_disk
    lock(keyboard)
    print"Oh dear. Hope you've made backups of your data
because you've just lost most of it..."
    return
```

Get your vaccines here

The virus problem is not as widespread in the UK as in America, and the availability of commercial virus-busting programs reflects this. Particularly for owners of 8-bit machines – the Spectrum, CPC, PCW, C64 *et alia*, there are few if any viruses in circulation and few if any vaccine programs.

If you're willing to do business with our transatlantic cousins, then an enormous quantity of software awaits. Otherwise you're probably going to have to dig around in the public domain - happy hunting...



ST

Very little, if anything, available commercially for the Atari machine, but a rummage through any of the PD catalogues will produce several vaccine programs. Try:
ST UK, 1 Bartholomew Road, Bishops Stortford, Hertfordshire CM23 3TP. Tel: 0224 593024.
Star UK, 50 Bridge Street, Aberdeen, Scotland. Tel:0224 593024

Amiga

Again, a dearth of good commercial vaccines (whatever happened to good old exploitation?)

Anti-Virus from DevWare Inc. offers three levels of protection against the virus. By checking the computer at power-up, monitoring each disk inserted into the drive for possible infection, and providing a method of inspecting and protecting copy protected software, Anti-Virus provides comprehensive coverage of vulnerable areas. DevWare Inc. P.O. Box 215, La Jolla, CA 92038-0215.

In the public domain, try:
Amiga PD Unlimited, 55 Highfield Avenue, Waterlooville, Hampshire PO7 7PY. Tel: 0705 266509.
George Thompson Associates, Dippen, Brodick, Arran, Scotland KA27 8RN. Tel: 077082 234.

PC

The available vaccines for the IBM PC and its compatibles reflect the business image of the machine, i.e. exorbitant pricing!

For your hard-earned money (£99 + VAT for the single-user or £159 + VAT for the multi-user version), you get the **Safeguard Security System** from Viraze (UK) Ltd, the business alter-ego of self-styled security expert Alan Soloman. This vaccine offers protection over a range of areas: automatic read-only/hidden protection of DOS system files, password entry, automatic write-protection of boot sectors, suppresion of FORMAT, FDISK and DM.EXE and lots more.

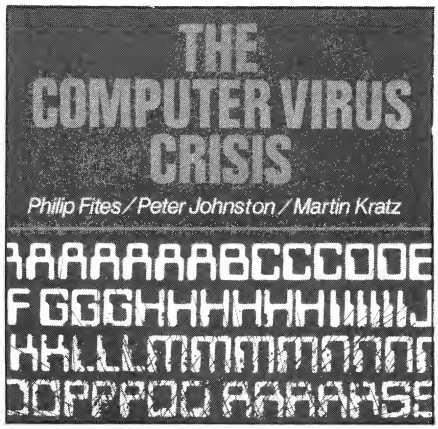
Included in the package is a very nice loose-leaf, fully indexed manual - but remember, you're paying for it!

For public domain vaccines, try:
Public Domain Software Library, Winscombe House, Beacon Road, Crowborough, Sussex TN6 1UL. Tel: 0892 663298.

Books

Some books about viruses are *The Computer Virus Crisis* by Fites, Johnston & Krantz (£13.95 from S&S on 0494 791900, ISBN 0-442-28532-9). This has a list of virus-busting programs and addresses, all American of course, and is oriented very much to the Mac user (this being the dominant machine there) though PC owners will find a lot of interest too.

Then there's the rather more technical *Computer Viruses - A High Tech Disease* by Ralf Burger (£17.45, available from 5370 52nd St SE, Grand Rapids MI



49508 USA, ISBN 1-55755-043-3), a wee bit sensationalist perhaps, but with plenty of interest for the tech buff.

For Amiga and ST owners a possible to try is *Computer Viruses* by Ralph Roberts ($14.95 from PO Box 8459, Asheville, NC 28814, USA, ISBN 0-87455-178-1). It's not specifically aimed at those machines but mentions them them rather more than the other two which are very PC-Mac based.

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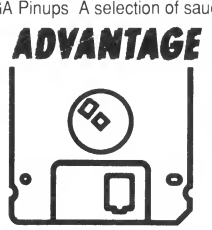

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You only have to task

If you've met an Amiga owner they'll impress you by saying how their machine can multi-task. But what exactly is this multi-tasking business everyone keeps talking about? Peter Worlock explains everything, strictly one thing at a time...

There comes a time in every computer user's life – recompiling a program, sorting a large database, printing a 60-page document – when you think there has to be a better way of working. You sit there, drinking coffee, or doodling pictures of PCs with axes through them, or simply staring in disbelief while your machine chunters away.

Of course, it is accomplishing something ... but you're doing nothing.

The obvious solution is to find some way of forcing the computer to do more than one thing at a time. In fact, the technique has been in use for years on mini and mainframe computers and is known as multitasking. But as the personal computer has become more powerful, multitasking is increasingly an option for individuals using small machines.

Though to call multitasking one technique is inaccurate, because there are several different ways of achieving similar ends. Each has benefits and drawbacks.

Pop-up utilities

The normal mode of operation for most personal computers is to run one program at a time. But this can present problems since few of us work that way: we constantly switch between a number of minor tasks, looking up an address when writing a letter, or making quick use of a calculator, or jotting notes while engaged in other applications.

But making those kinds of changes in traditional software usually takes more time and trouble than it's worth. You have to quit your current application, probably switch disks, load up the second program then quit that, swap disks and re-load the original software.

The first solution was the use of desktop accessories, pop-up programs, or TSRs – three different names for the same technique. Desktop accessories are usually found in windowing operating systems like those on the Macintosh, ST and Amiga. TSR stands for Terminate and Stay Resident and describes the method of creating desktop accessories on MS-DOS systems.

Both kinds of programs are also called pop-ups, simply because they pop up over another application.

Pop-ups are almost always the small-but-useful programs like notepads, calculators and address books, but have been extended to encompass fully-fledged word processors and spreadsheets.

So if you're working in a word processor and need a calculator you can call one up from a menu (if you're running a windowing system) or by a special "hotkey" sequence (if you're in MS-DOS). The pop-up appears in a small window over the main application, then vanishes once you're finished with it.

Task switching

Eventually it occurred to several software publishers that if it was possible to temporarily switch from a major application to a minor one, why not provide a way to switch between two major programs.

There are now a number of utilities that provide this facility: the Macintosh has Switcher, the ST has Hisoft's Twister, and MS-DOS boasts several programs. Even humble 8-bit micros like the Amstrad PCW are getting in on the act. (The Amiga doesn't need this facility, as we'll see.)

There are two ways of achieving this end. Both depend on a small program that acts as supervisor in the system, and both allow you to load two or more programs into memory. Where they differ is in the handling of the separate programs.

One method is to segment the available memory, turning a single computer into as many virtual machines as necessary. The second way is load only the core parts of each program while everything else remains on disk.

The advantage of the first method is that switching between applications is almost instantaneous, whereas the second requires that the current program is almost entirely saved to disk before the second application gains control of the computer. Even with a fast hard disk there are noticeable delays using this method.

• Multitasking is the ability to perform two or more operations simultaneously

Multitasking

In the case of both pop-up programs, and switchers, the computer isn't really multitasking – it isn't actually doing more than one thing at a time. Whenever you switch from one application to another, the former goes into hibernation until you return to it.

For many purposes this is an adequate solution, but there are tasks where it would be useful to have the computer carry on with the first task while you turn your attention to a second. This is true multitasking.

Computers offering this facility include the Amiga, and PCs, Macintoshes and others running a multitasking operating system such as OS/2, Windows/366, Desqview, Multifinder or Unix, to name but a few.

In one sense, multitasking is a straightforward development of the switcher: the computer switches between the tasks in cyclical fashion and at regular and very brief intervals. Apple took this route when it developed Switcher into the multitasking Multifinder.

Within this simple view of multitasking there is room for one or two variations. The first is known as simple time-slicing and awards a fixed portion of the processor's time to each task. However, different parts of a program will obviously fail to fit this simple division of labour since certain instructions take longer to execute than others. It would be inefficient to have the processor break off a task and return to it later if the task could easily be completed in a few more microseconds.

To overcome this drawback, the processor moves between tasks in a cycle, but awards time to each task in a more logical fashion. This allows a processor-intensive program, like maths calculation, more time than a program which spends most of its time waiting for input from the keyboard.

A third approach to multitasking makes no attempt at fairness. This makes use of interrupts and priorities. As the processor executes the first

☞

Spool the other one

The specific case of speeding up printing operations has a cheaper solution than a multitasking operating system: the humble print spooler.

The spooler is a small program which works in conjunction with a chunk of memory. Since the slow-down in print operations arises from the fact that the computer can transmit information faster than the printer can receive it, the answer is simply to stuff the information into a temporary store – the memory.

This allows the computer to carry on with other tasks. Meanwhile, the spooler program sends the data to the printer at a rate the printer can handle.

The cheapest solution is to buy a software spooler which makes use of the computer's own memory. However, this does take memory away from other applications, which could be a crucial drawback.

Better, but more expensive, is the hardware spooler – a black box that sits between the computer and printer. A secondary advantage of the hardware spooler is that it will provide far more memory – typically 64K to 256K – than you could afford to take from the computer.

Prices start at around £75 for a 64K buffer.

Software spoolers range from around £30 for commercial products, to nothing at all for public domain programs.

program it watches for interrupts from others. When an interrupt occurs, the processor checks the priority of the interrupting program and if it has higher priority than the currently executing application, ditches the current task and switches to the second.

If the interrupting program has a lower priority the processor ignores it until the current program gives it sufficient time to answer the demand.

The opposite of this method, called pre-emptive multitasking, is cooperative multitasking where high-priority programs must specifically allow the processor to attend to other tasks. In this case poorly written software can hog the processor, as well as other system resources like memory, the stack, device drivers and so on, so that the computer is never allowed to multitask.

Will it work for you?

So much for the theory. In practice multitasking is a grand illusion: it should be obvious that when you have a single computer with a single processor it can only do one thing at a time. The key is that the computer can execute millions of instructions every second, so by doing a few instructions from one program, then a few from another, and so on, it appears to us humans as though several things are happening simultaneously.

In its crudest form, any computer is capable of multitasking and most do. Whenever you encounter a computer – whether a Sinclair Spectrum or a 386 PC – playing a jaunty tune while alien spaceships sweep Earthwards, you're hearing and seeing multitasking in action. In fact, there is far more multitasking in the average game than in the average business application.

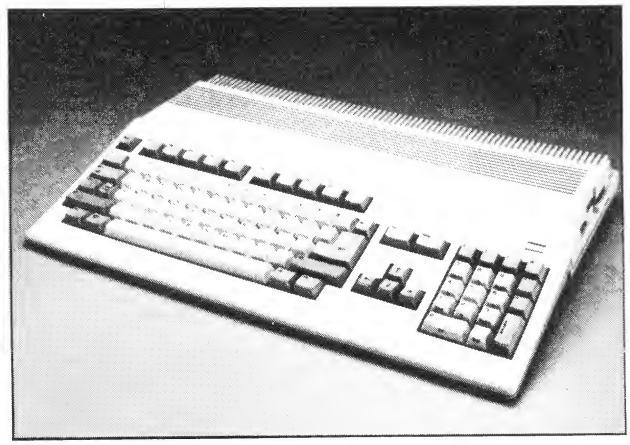
The obvious question is why that should be so. If multitasking is so powerful, why is it so little used?

The answer lies in that speed difference between humans and computers. The computer can complete most tasks before the human operator is ready to move on to other things. The tasks mentioned at the beginning of this article – compiling large programs, sorting large databases, and printing documents – are the exceptions.

So while multitasking can improve the efficiency of your computer, it can only do so in certain circumstances, namely those in which it is the computer that is slowing things down and not you.

Moreover, multitasking is expensive in terms of hardware. You need a fast computer – otherwise each task executes excruciatingly slowly – and lots of memory. Although the Amiga 500 is a true multitasking computer, you'll find it difficult to use with the standard 512K of RAM since that is barely sufficient for a single program, let alone three or four.

So for most users, a combination of task switching and pop-up programs will prove more valuable – and more economical – than a true multitasking environment. ●



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Will you still need me (when I'm 64)?

Launched back in 1982, the phenomenally successful Commodore 64 is now approaching world wide sales of 10 million units. Rik Haynes tries to answer the C64 million dollar question: how did it do it?

Why is the C64 the most popular micro in the world? Of course the C64's balance between good specification and attractive pricing wooed many a computer buyer. But probably the underlying driving force of the C64's success was Commodore's founder and computer selling guru, Jack Tramiel.

Tramiel had quite a turbulent life before setting up Commodore, he lost all his immediate family to the horrors of the Nazi concentration camp at Auschwitz during the war but he managed to escape to America and start his own typewriter repair company called Commodore. In the 1970s Commodore moved from typewriters to calculators and eventually went on to produce personal computers in the late 70s.

Boom and gloom

The next five years saw Commodore repeat success with even better success as it launched the Pet, the VIC-20 and then the C64 in 1982. With the C64 Commodore seemed to have hit the micro jackpot, with a micro capable of so much but at an affordable price.

With the micro industry booming during 1983, the C64 went straight to the top of the sales charts and found a place in computer enthusiasts' hearts around the world.

Then in January 1984 just as Commodore's sales were at an all-time high, Jack Tramiel resigned as Commodore's chief executive officer and ceased to be a director. In the process, Commodore had not only lost its founding father but also gained a tough competitor, for Tramiel bought Commodore's arch rival Atari from Warner Bros later that year.

As soon as Tramiel left Commodore, a worrying migration of disillusioned executive staff left Commodore, with many of them going on to Atari. This coupled with the general and marked drop in worldwide micro sales started to throw Commodore from profit into loss. To make matters worse, Commodore tried to release a new range of micros that were completely incompatible with the C64.

We're alright, Jack

Despite all these setbacks, one constant factor kept Commodore going – the popularity of the C64. Throughout the world, programmers had been lured to the C64 facilities which easily outshone the competition. Software developers took the C64 one step further by producing a string of high quality games which helped catapult the C64 to new heights of popularity and success.

Through the years the C64 has attracted some impressive, incredible and plain old classic games such as *Armalyte*, *The Last Ninja I* and *II*, *Delta*, *Wizball*, *Archon*, *Leaderboard*, *Encounter*, *Ghostbusters* and of course the superlative *International Soccer*.

After all its mistakes and miscalculations, Commodore is firmly back in shape, and looking to replace the C64 with its Amiga. Obviously, Jack Tramiel and his Atari ST is in the running too. But the C64 can still put these two micros straight into last position when you look at its huge software base and loyal following.

The post-micro boom days have seen the humble C64 bundled with a constant variation of goodies to induce the prospective first-time micro buyer to purchase a C64 starter pack.

The current batch of bundles for the C64 are made up of the Commodore Hollywood Box (C64, C2N datacassette unit, joystick and games based on a film/television theme from Ocean and Domark – price £149.99) and the Commodore Home Entertainment Pack (C64, C2N datacassette unit, joystick, bundled games software, Bush

Well I never!

Thirteen accounts of instantly forgettable Commodore and C64 trivia...

- Jack Tramiel resigned from Commodore on Friday the thirteenth... he eventually went on to buy Commodore's arch rival Atari.
- The first title released from US Gold was a C64 game imported from the States called *Beach Head*.
- General Alexander Haig was appointed to Commodore's board of directors in June 1984 – with Commodore chairman Irving Gould commenting, "his experience and reputation will be very helpful to us".
- In January 1985, The IBA (Independent Broadcasting Authority) banned the Commodore C64 TV ads featuring Maureen the Circus Elephant, following nationwide public pressure from animal lovers and the RSPCA who felt putting a grown Elephant into a giant pair of boxer shorts rather excessive and unnecessary. Surely not?
- Apparently 300,000 C64's were sold in June 1984 alone.
- Commodore funded an experiment in 1983 to aid Virginia Brauer, a supervisor of a Californian safari park, to teach Isaac the chimp to spell using a C64 and some special custom designed programs.
- C64 programming fanatics have found many unofficial bugs in VIC-II and ways of improving the C64's graphics and sound facilities to produce such effects as more than eight sprites, 4 channel sound-effects, full screen display and the illusion of more than 16 colours.
- Commodore gained The Royal Warrant in 1984.
- The Daily Mirror ran a competition with £20,000 of C64 prizes in 1983, which prompted one of its biggest reader competition responses with over 600,000 entries.
- Commodore announced a shirt advertising deal with first division football team Chelsea, worth 1.25 million to the club, in September 1987. Of course, Chelsea were relegated to the second division at the end of that season.
- Before it closed down, Commodore's plant at Corby reportedly produced 1.3 million C64s.
- Certain industry pundits are suggesting that as many as 35% of C64s sold over the Christmas 1988 period were returned faulty.
- Commodore produced a totally innovative software product for the C64 back in 1982 called *The Home Babysitter* cartridge designed "to keep your youngest child occupied for hours and teaches special learning concepts and relationships". Wow, don't leave home without loading it.

Keep it in the Commodore family

1976 PET announced, with 6502 microprocessor, 4K or 8K RAM and built-in green phosphor screen and cassette deck, and a keyboard with calculator-type keys.
1977 PET launched at Chicago Consumer Electronics Show in June, price $795.
1980 VIC-20 announced at Chicago CES in June, with 6502 microprocessor, 5K RAM, colour, sound, and compact full size typewriter style keyboard.
1981 VIC-20 launched at Las Vegas CES in January, price $299.95.
1982 C64 and Ultimax announced at Las Vegas CES in January. The Ultimax was a cross between a micro and a console with only 2K RAM (unexpandable), same VIC-II and SID graphics and sound chips as C64, and a membrane keyboard – Ultimax was never launched.
1982 C64 available for limited sale only in US indie retail outlets in September, price $595.
1982 Just before Christmas, approximately 200 adapted C64s from the States were grey imported into the UK by some dealers.
1983 SX-64 launched at Las Vegas CES in January. The SX-64 was a "portable" version of the C64 with built-in colour monitor, single- or dual disk drive capacity and detachable keyboard. The SX-64 probably never took off due to its immense size and weight which made it more of a luggable than a portable.
1983 Early 1983 saw the C64 on general release with a price drop to $399 and the C64 was officially released in the UK.
1983 The micro price wars began in August when Commodore slashed the C64 price from £345 to £229.
1984 C16 and Plus/4 announced at Las Vegas CES in January. The Plus/4 had 64K RAM, 6502 compatible processor, new graphics chip, built-in business software and restyled keyboard. While the C16 had the same processor and graphics chip as Plus/4, 16K RAM and slightly modified C64 keyboard. Unfortunately, both micros were incompatible with the C64 and this ultimately caused their downfall.
1984 Amiga Computer, Inc demonstrated the state-of-the-art Amiga Lorraine 68000-based micro to a select few at Chicago CES in June.
1984 Commodore purchased Amiga Computer, Inc in August.
1985 C128 launched at Las Vegas CES in January.
1985 Amiga previewed to invited guests only at London PCW Show in September.
1985 Commodore confirmed its plan to drop the Plus/4 and C16 micros in September.
1986 Amiga publicly seen at Birmingham Which Computer? Show in January.
1986 Restyled C64c launched at Chicago CES in June, with new style keyboard and bundled GEOS WIMP operating system.

personal stereo and a Yamaha electronic keyboard – price £199.99).

The seven year itch

Now the C64 is seven years old, you may think it's getting too long in the tooth and way past its prime - but you couldn't be more wrong. Obviously as the 16-bit machines become ever more increasingly popular, they'll take an even larger bite of the micro market – but the C64 is still alive and kicking and this situation looks set to continue way into the 1990's. After all, in its time the C64 has seen and fought off the other 8-bit competition including the Spectrum and CPC – and has totally wiped the floor with the poor Atari 800, Texas Instruments TI-44 and even Commodore's own C16 and Plus/4.

After all, if any 8-bit micro can seriously compete with the superior 16-bit machines, the C64 – with its attractive pricing and specification, huge software base and loyal user following – must surely be the one with the best fighting chance. Only time will tell... ●

Specs speak louder than words

C64

6510 microprocessor • 64K RAM • 16K ROM • VIC-II (Video Interface Chip) capable of displaying 40x25 text, 320x200 resolution, 16 colours, 8 sprites and hardware facilities for pixel smooth horizontal and vertical scrolling • SID (Sound Interface Device) producing 3 channel mono sound with filter control and triangle, sawtooth, pulse and noise wave generators • Built-in BASIC (V2.0) • Full size typewriter style keyboard suitable for touch typing with 8 programmable function keys • User port, serial port, cartridge port, disk drive and cassette ports, RF/TV output, Composite Video output, and 2 Atari-style game controller ports

C128

3 modes of operation: C64 mode (99.9% compatible with C64), C128 mode and CP/M mode • 8502 microprocessor (6510 compatible) • Z80A microprocessor • 128K RAM • 72K ROM • VIC-II and SID custom graphics and sound chips • C128 only video chip displaying 80x25 text and 640x200 resolution • Built-in BASIC (V7.0) and machine code monitor • Full size typewriter style keyboard with numeric keypad, separate cursor and control keys, and 8 programmable function keys • Same range of ports as C64 plus Audio Output/Input ports and Digital RGBI Video output.

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Ferrari Formula 1	17.99	19.99
F15 Strike Eagle	14.99	14.99
Fish	14.99	14.99
Flight Sim. 2	26.99	26.99
Flt Disc 7 or 11	13.99	13.99
Flt Disc European	13.99	13.99
Flt Disc Japan	13.99	13.99
Flying Shark	14.99	--.--
Football Director 2	11.99	11.99
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Frank Bruno Boxing	12.99	--.--
Freedom	11.99	11.99
Fusion	17.99	17.99
Galactic Conqueror	14.99	14.99
Galdregon's Domain	11.99	11.99
Game Over 2	13.99	15.99
Garfield	11.99	11.99
Garfield Winter	11.99	11.99
Ghosts 'n' Goblins	11.99	14.99
Golden Path	7.99	11.99
Grand Prix Sim. 2	11.99	11.99
Green Beret	11.99	14.99
Gryzor	11.99	14.99
Guerilla War	11.99	14.99
Gunship	14.99	14.99
Hacker 1 or 2	7.99	--.--
Hardball	9.99	--.--
Hawkeye	14.99	--.--
Hellfire Attack	11.99	11.99
Helter Skelter	9.99	9.99
Heroes of Lance	16.99	16.99
Highway Hawks	11.99	11.99
HK Machine	9.99	9.99
Hollywood Hijinx	7.99	7.99
Hostages	14.99	14.99
Hot Football	14.99	14.99
Hybris	--.--	19.99
Hyperdrome	11.99	--.--
I Ludicrus	14.99	14.99
Inc. Shrink. Sphere	13.99	16.99
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Ikari Warriors	9.99	14.99
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Joust	7.99	--.--
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Lancelot	11.99	11.99

TITLE	ATARI	STAMIGA
Last Duel	14.99	17.99
Leaderboard Birdie	13.99	16.99
LED Storm	13.99	13.99
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Living Daylights	11.99	--.--
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Manhattan Dealer	11.99	14.99
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Masters of Universe	9.99	--.--
Menace	11.99	12.99
Microprose Soccer	14.99	14.99
Mindshadow	7.99	--.--
Missile Command	7.99	--.--
Moonbase	7.99	--.--
Moon Patrol	7.99	--.--
Nebulus	13.99	17.99
Netherworld	13.99	17.99
Nigel Mansell	11.99	11.99
Night Hunter	13.99	--.--
Night Raider	13.99	13.99
North Star	9.99	--.--
Oids	11.99	--.--
Operation Neptune	14.99	14.99
Operation Wolf	11.99	14.99
Outrun	13.99	13.99
Outrun Europa	9.99	9.99
Pacland	11.99	11.99
Pacmania	11.99	11.99
Paperboy	11.99	14.99
Peter Beardsley	11.99	11.99
Phantom Fighter	--.--	13.99
Pioneer Plague	--.--	14.99
Platoon	11.99	14.99
Pool of Radiance	16.99	16.99
Populous	16.99	16.99
Powerdrome	17.99	17.99
Pro Soccer Sim	11.99	11.99
Psion Chess	16.99	--.--
Puffys Saga	17.99	17.99
Purple Saturn Day	14.99	14.99
Raffles	11.99	14.99
Rambo 3	11.99	14.99
Ramrod	16.99	16.99
Reach for Stars	--.--	15.99
Realm of Trolls	13.99	16.99
Rebels in Dark	11.99	11.99
Renegade 3	11.99	14.99
Return of Jedi	11.99	11.99
Return to Genesis	11.99	11.99
Road Blasters	13.99	13.99
Robocop	11.99	14.99
Rocket Ranger	19.99	19.99
Roger Rabbit	16.99	16.99
Rolling Thunder	13.99	16.99
R-Type	13.99	16.99
Running Man	14.99	14.99
Run the Gauntlet	11.99	14.99
Savage	14.99	14.99
Scrabble Deluxe	13.99	13.99
Sentinel	11.99	11.99
S.F. Harrier	14.99	9.99
Shadowgate	11.99	14.99
Shoot 'em up Con. Kit	14.99	14.99
Silent Service	14.99	14.99
Skateball	17.99	17.99
Skate or Die	17.99	17.99
Skychase	9.99	14.99
Space Harrier 2	13.99	16.99
Space Racer	11.99	11.99
Speedball	14.99	14.99
Starglider 2	14.99	14.99
Stealth Fighter	13.99	16.99
Storm Trooper	11.99	14.99
Street Fighter	13.99	16.99
S.T.O.S.	19.99	--.--
Strip Poker 2	9.99	9.99
Data Discs:-		
Bev & Dawn	7.99	7.99
Lee & Roy	7.99	7.99
Rachel & Kim	7.99	7.99
Suzanne & Bianca	7.99	7.99
Superbase Personal	--.--	59.99
Super Breakout	7.99	--.--
Supercycle	7.99	--.--
Super Hangon	13.99	16.99
Superman	14.99	14.99
Sword of Sodan	--.--	16.99
Tass Times	7.99	--.--
Teenage Queen	11.99	11.99
Test Drive	17.99	19.99
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TT Racer 2	14.99	--.--
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Ultimate Golf	13.99	13.99
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Univ. Military Sim.	14.99	14.99
UMS Scenario 1	8.99	8.99
UMS Scenario 2	8.99	8.99
Victory Road	11.99	14.99
Vindicators (Domark)	11.99	11.99
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Wanderer	11.99	11.99
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WEC Le Mans	11.99	14.99
Weird Dreams	14.99	14.99
Wizball	13.99	16.99
Xenon	11.99	14.99
Zany Golf	13.99	16.99

TITLE	SPECTRUM Cass	SPECTRUM Disc	CBM 64 Cass	CBM 64 Disk	AMSTRAD Cass	AMSTRAD Disk
Ace	2.99	--.--	2.99	4.99	2.99	--.--
Ace 2	2.99	--.--	2.99	4.99	2.99	--.--
Ace of Aces	2.99	--.--	2.99	--.--	2.99	--.--
Afterburner	6.99	10.99	6.99	10.99	6.99	10.99
Airborne Ranger	128..9.99	--.--	6.99	13.99	--.--	--.--
Alien Syndrome	6.99	--.--	6.45	9.95	6.45	9.95
Andy Capp	--.--	--.--	2.95	--.--	2.95	--.--
Archon Collection	6.99	10.99	7.45	10.45	7.45	10.45
Arc of Yesod	2.99	--.--	--.--	--.--	--.--	2.95
Arkanoid 2 Revenge	5.50	9.99	6.00	9.95	6.50	9.95
Army Moves	3.99	--.--	3.95	--.--	3.95	--.--
Athena	3.99	--.--	2.95	--.--	--.--	--.--
Baal	--.--	--.--	6.95	9.95	--.--	--.--
BallBreaker	2.00	--.--	--.--	--.--	2.00	--.--
Barbarian Psygnosis	6.99	--.--	6.95	--.--	6.95	--.--
Barbarian 2 Palace	6.99	--.--	6.95	9.95	6.95	9.95
Bards Tale 1	6.99	--.--	7.45	10.95	7.45	10.95
Bards Tale 2 or 3	--.--	--.--	--.--	12.95	--.--	--.--
Batman Caped Crusader	5.99	9.99	6.25	9.95	6.25	9.95
B'Dash Con Kit	3.99	--.--	--.--	--.--	3.95	--.--
Best of Beyond	--.--	--.--	2.95	3.95	--.--	--.--
Best of Elite Vol 1	3.99	--.--	3.95	--.--	3.95	--.--
Best of Elite Vol 2	--.--	--.--	6.95	--.--	--.--	--.--
Blackbeard	2.99	--.--	--.--	--.--	2.99	--.--
Black Lamp	3.99	--.--	--.--	--.--	--.--	--.--
Black Tiger	6.99	--.--	7.45	9.95	7.45	10.95
Blasteroids	6.50	--.--	6.95	9.95	--.--	--.--
Blood Valley	2.99	--.--	--.--	--.--	2.95	--.--
Bombuzal	6.50	--.--	6.45	9.95	--.--	--.--
Bounces	2.00	--.--	2.00	--.--	--.--	--.--
Buggy Boy	5.99	--.--	6.95	9.95	6.95	9.95
Captain Blood	6.99	--.--	6.95	9.95	6.95	9.95
Carrier Command	9.99	13.99	9.95	13.95	9.95	13.95
Chessmaster 2000	--.--	--.--	7.50	10.50	--.--	--.--
Chuck Yeager	--.--	--.--	7.50	10.50	7.50	10.50
Circus	6.99	10.99	--.--	--.--	--.--	--.--
Classic Collection	--.--	--.--	3.00	--.--	3.00	--.--
Comet Game	1.00	--.--	1.00	--.--	1.00	--.--
Command Performance	8.99	12.99	8.95	10.95	8.95	12.95
Crazy Cars 2	6.50	--.--	6.50	--.--	6.50	--.--
Crosswize	4.99	--.--	--.--	--.--	--.--	--.--
Daley Thompson 88	6.50	--.--	6.50	9.95	6.50	9.95
Dandy	--.--	--.--	--.--	--.--	2.50	2.95
Dark Fusion	5.99	8.99	6.95	9.95	6.95	9.95
Dark Side	6.99	9.99	6.95	9.95	6.95	9.95
Deflektor	--.--	--.--	2.95	--.--	2.95	--.--
Denaris	6.99	--.--	6.99	10.99	6.99	10.99
Derek Bells Le Mans	--.--	--.--	7.45	10.45	--.--	--.--
DNA Warrior	6.50	--.--	6.50	10.00	--.--	--.--
DoomDarks Revenge	2.99	--.--	--.--	--.--	--.--	--.--
Double Dragon	6.50	9.99	6.95	9.95	6.95	9.95
Dragon Ninja	6.50	9.99	6.95	9.95	6.95	9.95
Dragon's Lair	2.99	--.--	2.95	--.--	2.95	--.--
DragonSlayer	--.--	--.--	5.95	--.--	--.--	--.--
Druid	2.00	--.--	2.00	--.--	2.00	3.00
Dynamite Dan 2	--.--	--.--	--.--	--.--	2.95	3.95
Earthlight	3.99	--.--	--.--	--.--	--.--	--.--
Eliminator	6.50	--.--	7.45	--.--	7.45	--.--
E. Hughes Football	6.99	9.99	6.95	8.95	6.95	9.95
Empire	--.--	--.--	2.95	--.--	2.00	--.--
Empire Strikes Back	6.99	--.--	6.95	9.95	6.95	9.95
Espionage	6.50	9.99	6.95	9.95	6.95	9.95
Exploding Fist +	5.00	--.--	6.95	8.95	--.--	--.--
4 x 4 Off Road Racing	6.99	--.--	7.45	10.95	7.45	10.95
Fair Means or Foul	5.99	8.99	6.95	8.45	6.95	9.95
Fast Break	--.--	--.--	7.45	10.45	--.--	--.--
Fernandez Must Die	6.99	9.99	6.95	9.95	6.95	9.95
Final Frontier	--.--	--.--	9.00	12.00	--.--	--.--
Final Matrix	2.00	--.--	--.--	--.--	2.00	--.--
Fish	--.--	9.99	--.--	11.95	--.--	11.95
Fists & Throttles	8.50	9.99	8.45	9.95	8.45	9.95
Five Computer Hits	3.99	--.--	3.95	--.--	--.--	--.--
Five Star 2	6.99	--.--	6.95	--.--	6.95	--.--
Flight Ace	9.99	12.99	9.95	12.95	9.95	12.95
Fox Fights Back	6.00	8.99	6.95	9.95	6.95	9.95
Football Director	6.50	--.--	6.45	--.--	6.45	--.--
F15 Strike Eagle	6.99	--.--	6.95	9.95	6.95	9.95
F16 Combat Pilot	9.99	12.99	9.95	12.95	9.95	12.95
Football Manager	2.99	4.99	2.95	6.95	2.95	6.50
Football Manager 2	6.99	9.99	6.95	9.95	6.95	9.95
Freddy Hardest	2.99	--.--	2.95	--.--	2.95	--.--
Game Over	3.50	--.--	--.--	--.--	3.50	--.--
Game Over 2	6.99	9.99	6.95	9.95	6.95	9.95
Game Set & Match 2	8.99	11.99	8.99	11.99	8.99	--.--
Garfield	6.00	--.--	6.50	--.--	6.50	--.--
Garfield Winter	6.00	--.--	6.50	10.00	6.50	10.00
Gauntlet	2.99	--.--	2.99	--.--	2.99	--.--
Giants	10.50	13.99	10.45	12.95	10.45	13.95
G. Lineker Hotshot	6.99	10.99	7.45	10.95	7.45	10.95
Grand Prix Circuit	--.--	--.--	7.45	10.45	7.45	10.45
Grand Prix Sim. 2	2.99	--.--	--.--	--.--	2.99	--.--
Guerilla Wars	5.00	9.99	6.45	9.95	6.45	9.95
Gunship	6.99	9.99	9.95	13.95	9.95	13.95
Head Coach	2.99	--.--	2.99	--.--	--.--	--.--
Head Over Heels	--.--	--.--	3.50	--.--	3.50	--.--
Heartland	2.00	--.--	1.95	--.--	--.--	2.95
Hellfire Attack	6.99	10.99	7.45	10.45	--.--	--.--
Heroes of the Lance	6.99	10.99	7.45	10.45	7.45	10.45
Hive	2.00	--.--	--.--	--.--	2.00	2.95
H K Machine	6.99	10.99	7.50	10.50	7.50	10.50
Hostages	--.--	--.--	6.50	10.00	--.--	--.--
Ikari Warriors	5.99	--.--	6.95	9.95	6.95	9.95
Inc. Shrinking Sphere	6.99	10.99	7.45	10.95	7.45	10.95
Ingrids Back	9.99	12.99	9.95	9.95	9.95	12.95
Int. Karate	2.99	4.99	2.95	6.95	2.95	6.95
Into Eagles Nest	--.--	--.--	2.95	--.--	2.95	--.--
Jailbreak	--.--	--.--	2.95	--.--	2.95	--.--
Jet Bike Simulator	--.--	--.--	5.95	--.--	--.--	--.--
Karate Ace	10.50	12.99	10.45	12.95	10.45	12.95
Konami Collection	6.50	12.99	6.95	12.95	6.95	12.95
Krakout	2.99	--.--	2.99	--.--	2.99	--.--
Lancelot	9.99	11.99	9.95	11.95	9.95	11.95
Laser Squad	6.99	--.--	6.95	--.--	6.95	--.--
Last Duel	6.99	10.99	7.45	10.95	7.45	10.95
Last Ninja	--.--	--.--	6.95	9.95	--.--	--.--
Last Ninja 2	8.99	--.--	8.95	9.95	8.95	10.95
L'Board Par 3	10.99	13.99	--.--	--.--	10.95	13.95
L'Board Par 4	--.--	--.--	10.95	12.95	--.--	--.--
LED Storm	6.99	9.99	7.45	10.95	7.45	10.95
Mag Max	--.--	--.--	2.95	--.--	3.50	--.--

TITLE	SPECTRUM Cass	SPECTRUM Disc	CBM 64 Cass	CBM 64 Disk	AMSTRAD Cass	AMSTRAD Disk
Mask 2	2.99	--.--	--.--	--.--	2.95	--.--
Masters of the Universe	--.--	--.--	2.95	--.--	2.95	--.--
Metaplex	2.99	--.--	2.99	--.--	2.99	--.--
Metrocross	2.99	--.--	2.99	--.--	2.99	--.--
Micro Soccer	--.--	--.--	9.95	13.95	--.--	--.--
Mini Office 2	--.--	--.--	9.95	13.95	9.95	13.95
Mini Putt	6.99	10.99	6.95	10.45	6.95	10.45
Modem Wars	--.--	--.--	--.--	10.45	--.--	--.--
Motor Massacre	5.99	8.99	6.95	9.95	6.95	9.95
Muncher (T Wrecks)	5.99	10.99	7.45	10.95	7.45	10.95
Nemesis The Warlock	2.00	--.--	--.--	--.--	--.--	--.--
Nether World	5.99	9.99	7.45	10.95	7.45	10.95
Neuromancer	--.--	--.--	--.--	12.95	--.--	--.--
Nigel Mansell GP	6.99	--.--	--.--	--.--	6.95	10.45
Night Raider	7.50	--.--	5.95	10.95	7.45	10.95
Nodes of Yesod	2.00	--.--	2.00	--.--	--.--	--.--
Obliterator	6.99	--.--	6.95	9.95	--.--	--.--
Operation Neptune	--.--	--.--	7.45	10.95	7.45	10.95
Operation Wolf	5.50	9.99	5.95	9.95	5.95	9.95
Outrun	5.99	--.--	7.45	10.45	7.45	10.45
Overlord	6.99	--.--	--.--	--.--	--.--	--.--
Pacland	5.99	--.--	6.25	9.95	6.25	9.95
Pacmania	5.99	--.--	6.25	9.95	5.95	9.95
Patton vs Rommel	--.--	--.--	--.--	10.95	--.--	--.--
Peter Beardsley	5.99	--.--	6.95	9.95	6.25	9.95
PHM Pegasus	6.99	10.99	7.45	10.95	--.--	--.--
Pirates	--.--	--.--	9.95	13.95	--.--	13.95
Pool of Radiance	--.--	--.--	--.--	19.95	--.--	--.--
Power at Sea	--.--	--.--	--.--	10.95	--.--	--.--
Power Play Hockey	--.--	--.--	--.--	10.95	--.--	--.--
Predator	7.50	--.--	7.45	10.95	7.45	10.95
President is Missing	--.--	--.--	8.95	10.95	--.--	--.--
Project Firestart	--.--	--.--	--.--	10.45	--.--	--.--
Pro Soccer (CRL)	6.99	--.--	6.95	--.--	--.--	--.--
Pro Soccer Sim	6.50	8.99	6.95	9.95	6.95	9.95
Purple Saturn Day	6.50	9.99	6.50	10.00	6.50	10.00
Question of Sport	9.99	13.99	9.95	13.95	9.95	13.95
Rack Em	--.--	--.--	6.95	10.45	--.--	--.--
Raffles	5.50	--.--	6.00	--.--	6.50	--.--
Rambo 3	5.99	9.99	6.45	9.95	6.45	9.95
Realm of Trolls	--.--	--.--	7.45	10.95	--.--	--.--
Red October	9.99	--.--	9.95	13.95	9.95	13.95
Red Storm Rising	--.--	--.--	9.95	12.95	--.--	--.--
Renegade 3	5.99	--.--	6.50	10.00	6.50	10.00
Return ofJedi	6.99	9.99	6.95	9.95	6.95	9.95
Rex	6.99	10.99	7.45	10.45	7.45	10.45
Revs	--.--	--.--	2.95	--.--	--.--	--.--
Robocop	5.99	9.99	6.45	9.95	6.45	9.95
Rocket Ranger	--.--	--.--	--.--	12.99	--.--	--.--
Rock Star	5.99	--.--	--.--	--.--	--.--	--.--
Roy of Rovers	6.99	9.99	7.45	10.95	7.45	10.95
R-Type	6.99	--.--	6.95	10.45	6.95	10.45
Run the Gauntlet	5.99	--.--	6.50	10.00	6.50	10.00
Rygar	2.99	--.--	2.99	--.--	2.99	--.--
Samurai Trilogy	--.--	--.--	2.95	--.--	2.95	--.--
Samurai Warrior	4.99	--.--	5.95	9.95	5.95	9.95
Sanxion	6.50	--.--	2.95	--.--	--.--	--.--
Savage	5.50	--.--	6.95	8.95	5.95	9.95
S.D.I. (Activision)	7.50	--.--	7.45	10.45	--.--	--.--
Sentinel	--.--	--.--	2.95	4.95	--.--	--.--
Serve & Volley	--.--	--.--	7.45	10.45	--.--	--.--
Shockway Rider	--.--	--.--	2.95	--.--	2.95	--.--
Short Circuit	--.--	--.--	2.95	--.--	3.95	--.--
Shoot em Up Con. Kit	--.--	--.--	--.--	10.95	--.--	--.--
Shoot Out	3.99	6.99	3.99	--.--	7.45	10.45
Sidewize	2.99	--.--	2.95	--.--	--.--	--.--
Silent Service	6.99	--.--	6.95	9.95	6.95	9.95
Skateball	6.99	10.50	7.45	10.45	7.45	10.45
Skate or Die	6.99	10.50	7.45	10.45	7.45	10.45
Space Ace	10.50	12.99	10.45	12.95	10.45	12.95
Space Ball	--.--	--.--	7.45	10.95	--.--	--.--
Spitting Image	6.99	9.99	6.95	9.95	6.95	9.95
Spy Hunter	2.99	--.--	--.--	--.--	2.99	--.--
Spy v Spy Arctic	2.99	--.--	2.95	--.--	2.95	--.--
Stalingrad	7.50	9.99	--.--	--.--	--.--	--.--
Star Wars	6.99	--.--	6.95	9.95	6.95	9.95
Stealth Fighter	6.99	9.99	9.95	13.95	--.--	--.--
Strip Poker 2	6.50	--.--	6.95	9.95	--.--	--.--
Super Cycle	2.99	--.--	2.99	--.--	2.99	--.--
Super Dragon Slayer	--.--	--.--	5.95	--.--	--.--	--.--
Super Hangon	--.--	--.--	7.45	10.95	7.45	10.95
Superman	5.99	9.99	6.95	9.95	6.95	9.95
Super Sprint	2.99	--.--	2.95	--.--	--.--	--.--
Super Sunday	--.--	--.--	3.95	--.--	--.--	--.--
Supreme Challenge	8.50	11.99	8.95	11.95	8.95	11.95
3D Pool	6.50	--.--	6.50	9.00	6.50	10.00
20 Chartbusters	6.99	--.--	6.95	--.--	6.95	--.--
Taipan	--.--	--.--	3.95	--.--	3.95	--.--
Taito Coin Ops	8.50	--.--	8.95	11.95	8.95	11.95
Target Renegade	5.50	--.--	5.95	9.95	5.95	9.95
Techno Cop	6.50	10.99	7.45	10.95	7.45	10.95
Terrapods	6.50	--.--	6.95	--.--	6.95	--.--
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• Just one of the 17 halls at the Hanover Show. Thankfully, there's an electronic visitor information system to help you find your way around.

• The long awaited appearance of Stacey, the Atari laptop first shown at Comdex in a balsa wood form! But here it's up and runniing and should sell well when it hits the streets in June.

Massive attack

Hanover's annual CeBit Computer Fair is the World's biggest. This year 500,000 visitors are expected to walk the 325,000 square metres of space taken by 3000 exhibitors. At Atari UK's invitation, Andy Storer joined the crowds and prepared for visual overload.

Throw 14 journalists together in a 5 star hotel for 18 hours before a show going on the size of 17 Olympias, and you have a party just dying to be featured in the *Eye*'s 'Great Bores of Today'.

Throw in a delayed flight, a five course "No Velle" cuisine and an unlimited supply of Jever Pilsner, and conversation takes on that peculiar hack quality of enthusiastic cynicism.

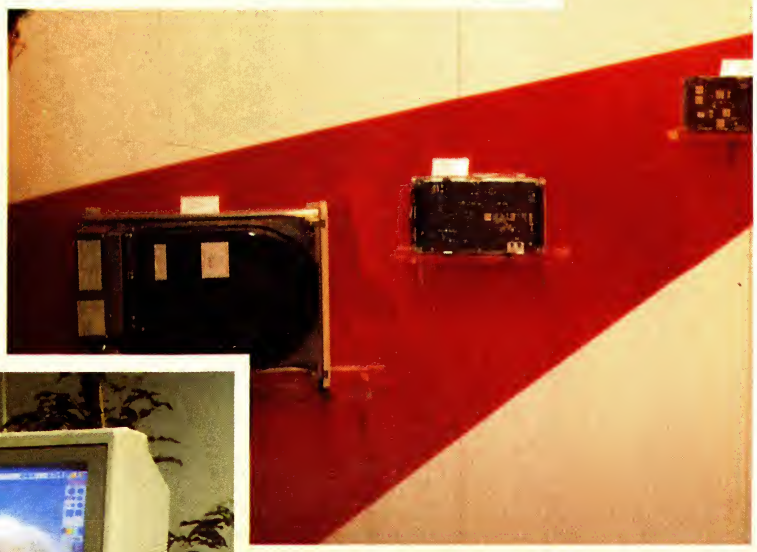
Stories of the shows in Vegas, L.A., Frisco, Paris, Monte Carlo and the legendary Toshiba freebie to Japan – so legendary nobody went on it – are only interrupted by 'power talk' on the latest 386 machines, comms upload problems and hard disk utilities. But reminiscences remain the delight of the day. At the '85 Olivetti journo's gig in Venice, for instance, the company celebrated their conquest of 35% of the Italian market by hiring a whole island, taking over the Griti Palace, arranging a midnight trip around the museum and running up a bill of 6 million Lire at Harry's Bar. Hanover would no doubt become Hungover with ease.

By 2am, the hotel bar plays host to a small enclave of Atari personnel and a few journalists lucky enough to catch them willing to let on. "Yes, Stacey will be there tomorrow", "No, the Super-ST, as you call it, won't", "We have 5 versions of the Folio planned", "At the end of this year every product you've heard of will be out", "We want the real guy who's buying power".

And yes, next day, in amongst the mass of monitors, keyboards and decks that make up The Launch Pad known as CeBit '89, Stacey was indeed there. And in its final form this time. Available by June/July, the 1 Meg Atari laptop looks and feels fine. A dark grey briefcase exterior opens to reveal a green super-twist LCD screen on the inside lid above a punchy keyboard and inlaid tracker ball instead of a mouse. On the right hand side are two 720K drives, whilst over the left are serial and parallel, joystick and mouse ports. Stacey runs TOS V1.09 and is reported to run for about 4 hours on its internal batteries. It'll come in at just under £1,000.

Elsewhere on the Atari stand was a new mono monitor, the SM194, costing around £1,600 and offering 1280x960 resolution for its main intended application, DTP work. Since Atari want to move

• The natty SM 194 19" mono monitor was the other new piece of kit on Atari's stand, that's if you discount the Pocket PC, the ATW 1 and the range of 13 calculators. But no sign of the Mega ST 1 or the Super-ST – now affectionately dubbed the 'TT'



• Toshiba's giant laptop (above) brought new meaning to the term 'portability'. The display was actually running off a life-size model.
• Fujitsu's stand (right) certainly contained some of the most interesting developments. Besides the Voice Communication Unit, its 3.5 inch 180 MByte hard disk illustrated just how far technology has come since its 14.5 inch version of ten years ago

into "the high-end of the workstation market" with their ATW 1 transputer machine, it would seem this monitor will also be perfect for the medium data processing and scientific applications that involves.

• Commodore's "Videobox' for the Amiga A500 demonstrated the company's drive for low-cost desktop video.

Otherwise, there was no sign of the Atari Unix machine but in a back room was a prototype of the 'Super ST' Atari refers to as the 'TT'. This was rumoured to be just an ST running on a 68030 chip and showing off ultra-fast animated graphics, but the final machine, claimed to be available by September, will also offer 1280x960 resolution and 2 Mb of RAM.

A long walk to the Commodore stand involved passing just about every major manufacturer in the world. There's so much space you don't get the claustrophobia of British shows – you can actually hear something above the din of conversation. Unfortunately, this proved to be variations on every Jean Michel Jarre track ever heard. In amongst the American and Taiwanese 'villages' were the Epson stand, featuring a giant 60' x 15' panoramic screen showing off, among other things, its new 48-pin printer, Toshiba's 30 foot high model of their laptop, a Casio space featuring models lazing around the very latest in check-out tills and Microsoft's green laser installation drawing attention to their latest OS/2 and Mac software. Next to Mitsubishi's 37" monitor displays were Hong Kong's 3P Products' fastest 386 in the world – the 33MHz CAS386C33 – clocking in at an incredible 51Mhz on some benchmarks. Fujitsu showed off its Voice Communication Unit – a PC compatible system able to recognise 4,000 spoken words and, unbelievably, output a single voice response for over 80 minutes. Right next to it was a 3.5" hard disk in a case some 6" long by 1.5" capable of storing 180 Mb! Fujitsu is really going great guns – it's about to release the FM-TOWNS - a 32-bit, MS-DOS home micro in Tokyo with built in CD ROM and expect it to sell in droves even for an asking price of $4,000. Meanwhile, NEC presented its £700, 550 Mb, PC and hi-fi compatible CD ROM unit with two of the twenty applications already released for it – *Clip Art 3D* and *Image Folio*. Both contain 4,000 images, and sell for £250.

More homegrown varieties were present in the form of Amstrad – nothing to report here really except the release of a 20 Mb hard drive for the PC 1512 – and a stand shared by Psion and Cambridge Computers. This marriage seemed a little ironic; after all, Psion is releasing a Z88-style laptop in June or so. We'd like to think they're jointly preparing for the D.I.P./ Atari 5 Folio machine onslaught, but they were probably just saving money. Probably the same reason there was no sign of Acorn.

At last to the Commodore installation, where the company was beaming over a 74% growth in its German home market penetration and announcing it's "Business At Home" drive. This centres on the perceived need for a good-priced AT. The solution was the launch of a £1,200 286 upgrade for the PC 30 and 386 SX for the PC 50. Looking towards the top end of the market, it also underlined plans for its Amiga 2500 Unix machine and A2000-based transputer workstation. Back on the Home/Business front it showed off its new DTP package comprising a 3Mb A2000, 40 Mb hard disk, Sharp JX 300 colour scanner, NEC LC 890 Postscript compatible laser printer and *Professional Page* and *Draw* software.

Also attracting much interest was a very sexy Commodore-badged Desk Top Video system – "Videobox" – comprising genlock, digitiser and RGB splitter in a casing along with 'Diamond' painting, 'Quick Silver' animation, 'Effects' digital image merger and 'Video Titler' titling software. All IFF and PAL compatible and coming out at £500 for the A500 upwards.

From then on it was a Press bus back to Atari and a quick look at the new Steinberg music package – a Beta test version of the all-singing, all dancing *Soundworks FZ1* – and a really tasty solid 3D animation package called *AXIS*. More on this soon.

After that, the airport, more beers and endless recounting. The verdict? Great in so far as it went but how much can you cover in 7 hours on this scale? ●

clik - ST

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• Played into his hands: Clifford Stoll set a trap for the hacker spies – and they fell for it

Spycatcher

Two weeks ago eight young computer hackers were arrested in West Germany for allegedly spying on behalf of the Soviets. The story involves international espionage at the highest levels; it puts the concept of a generation of computer literates into disturbing perspective; and it's got a hero. All in all, it's cracking stuff...

Colin Campbell explores what could possibly emerge as computing's most fascinating saga to date

It's been obvious for a long time now that some poor fools with a handy knowledge of computing would end up being tempted, entangled and destroyed by the insidious lure of power, money and danger.

So many science fiction writers and spy novelists have introduced the computer hacker as a major tool for espionage (William Gibson in Count Zero, for example) that when it really happens, nobody is terribly surprised. All this will be of little relevance to the eight young men aged between 25 and 35 who are now languishing in German cells accused of spying for a possible enemy.

They have spent years tapping into key networks and passing info on to the no doubt delighted Soviets. Their skills are not extraordinary. Their profits are not particularly impressive. Their punishment is likely to be severe.

The personalities of the eight young computer hackers herded into vans last week by West German police are not known. But it's a fair bet that they're not fiery-eyed ideologues with a passion for world revolution; more likely they are interested in comms rather than Communism.

The hackers are already pleading that they were being blackmailed by their KGB spymasters from East Berlin. Their toils brought in £100,000 over the years along with that most squalid of rewards – drugs.

The cosy spy ring would still be riding high if it weren't for the extraordinary efforts of one computer enthusiast who set about unravelling one of computings' most fascinating stories...

For whom the bell Stolls

Dr Clifford Stoll is an all round clever bloke with a penchant for the stars and a healthy interest in computers. Whilst working as an astronomer in Berkeley, California, he stumbled across a 75 cent discrepancy in his "shared time" computer system accounts.

He was intrigued and baffled. How on earth had this oddity managed to creep in? "If it had been $1,000 off, I wouldn't have thought anything of it," he said. "It's like if your house collapses you just assume there has been an earthquake. But if you find a tiny termite hole, you think 'Jeez, I had better investigate'."

• Checkpoint Charlie: Secret data on disk was passed to the Soviets

Cyberpunk-like, Stoll set about exploring the tangled computer networks in search of the seventy five cent source. After three days of poking in every corner of the system he found the culprit.

The charge had come from someone who had crept into the computer through the telephone lines. This was in the summer of 1986 when the concept of computer hacking was more Hollywood than anything else.

Stoll then spent four months assiduously monitoring the hackers toils. It became apparent that they were using the Berkeley network as a gateway to the computer system called Milnet which links up vital computers in military establishments, university laboratories and key centres of defence.

Stoll became even more involved as words such as SDI, biological warfare, nuclear and NORAD cropped up. He contacted the Federal Bureau of Investigation and passed on his discovery. The FBI were not impressed especially since it all began from a 75 cent overcharge. They are reported to have responded: "Who cares? It's not important."

By now Stoll was hooked. The investigation was becoming an obsession as he dug up new ways of tracking the hackers. He connected an electronic pager to the computer which alerted him every time the intruders broke in.

His girlfriend, hardly surprisingly, became annoyed with his obsession. In an attempt to put an end to the thing she suggested he try and ensnare the hackers with a trap.

A program, guaranteed to get the hackers' fingers furiously tapping, was designed and enticingly called SDI Net. The hackers probably sniffed bags of cash when the opportunity was discovered and promptly spent two hours rummaging through the bogus material.

It was plenty of time. Stoll tracked the call to one the world's most notorious centres of illegal computer activities – Hanover, West Germany.

A man in Pittsburgh sent Stoll a letter some months later asking for information concerning SDI Net. Once again, Stoll approached the FBI. This time they were convinced. The Pittsburgh man was picked up, his contacts with East European countries unearthed and a full scale investigation was initiated.

The spy who bugged me

The FBI and the Bundesamt für Vurfassungsschutz (German secret service) closed in on the hackers over a period of 18 months. The spies were being paid £1,500 for each disk. Many contained data from the pentagon, nuclear laboratories and US space secrets; British intelligence was also infiltrated.

Officials are keen to stress that the hackers missed the West's most sensitive secrets and that the Soviets were only receiving low level information. Nevertheless, it is generally agreed that the efforts of the hackers has closed the technology gap between the East and West.

"I would say that Dr Stoll is largely responsible for cracking the case," said Charles Hurley, former spokesman for the Lawrence Berkeley laboratories. "Over a period of many months he tracked them."

And Stoll? He's made his way to Harvard to get back to some star gazing. "It was exciting, but in another sense it was dreadful because I got zero astronomy done for two years," he said.

As for the hackers, they face a long and drawn-out bout of painful revelations and accusations. If found guilty (and an 18 month investigation as well as confessions already gleaned suggests something) they face a few years banged up. Hackers looking for ready cash and stimulation take note.

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You've had your chance

Just where is *Calamus*? Flagged as the best and most comprehensive DTP package for the ST, *Calamus* had been dogged by delay after delay. Sorry, excuse after excuse. Atari UK has been sitting on the package for over six months. Why? It was completed in late 1987 by DMC of Germany. And has been shipping in the States for many months. So what has happened? Atari UK's line is that bugs in the original version are being ironed out.

Originally, is seems, Signa Publishing were to distribute *Calamus* in the UK. Somehow Atari got involved and DMC decided it would be more prestigious if Atari handled the package. So much for the brief history. Recent rumours suggest that DMC is unhappy with Atari UK's handling of *Calamus* and is giving the distribution rights to Signa. This ties in with reports that Signa is to make a major announcement shortly. That said, neither Atari or Signa would confirm the story.

To add to the confusion, Gainstar is importing the American version of *Calamus*. Price is £200, which compares favourably to the Atari-quoted tag of £399. However, don't get too excited because it transpires that the American version won't work on UK STs. The reason, it seems, is not because of poorly written code that accesses the ROM, but a protection mechanism that checks to see if the machine is of US origin. If the computer isn't from the States then the software refuses to work. The reason for this insane practice is to prevent companies importing the American version.

So far so good? Well, here's the really sickening part. American distributors in the States claim to have the UK version and can't understand why it isn't available here. Gainstar, meanwhile, hopes to have the UK version currently touring the States on sale here soon. Ohh, it's more fun than *Dallas*!

We shall overcome

If you've been wondering why Glentop has been so quiet on the ST scene lately, it's because GFA System Technik in Germany – producers of the GFA range of software – is to set up shop in the UK. Glentop publishes the English versions of GFA's products, so naturally GFA's move to the UK will disrupt Glentop's trading. In fact, it is very likely that when GFA arrives, Glentop will no longer handle any of System Technik's software. Glentop's MD, Peter Holme, reckons this is perfectly legal according to the conditions in the contract.

The move, claimed GFA Germany's boss Rolf Hilschner, is due to take place in early July. Apparently a "well-known" figure in the industry is to head GFA's UK operations; Hilshner didn't dwell on the subject. He did add that "many exciting new packages would be released."

Until July, no new GFA software will be seen. This explains why *GFA Raytrace* hasn't hit the shelves yet – even though Glentop has completed the translation. As a result of GFA's planned actions, Glentop is to move into the PC market and do little else on the ST. Catherine Peel's book – *Programmer's Reference to the ST* – will be reprinted from time to time to accommodate new TOS and machine versions; but apart from that not much else will be done.

GFA is a multinational company that has offices in Germany, France and the USA amongst others. Obviously the UK's ST market has come of age if GFA is willing to open offices here. Keep a look out; you're going to hear a lot from GFA in coming months.

Quickies

● ***Flair Paint*** – written and designed by Jeff Lawson and Mark Picavance, and published by AMS/Logitech – is to be handled by Database Software. The reason is thought to be linked with Logitech's hatred of anything non-PC. The product, packaging and price will remain at £34.99. Database is on 0625 878888.

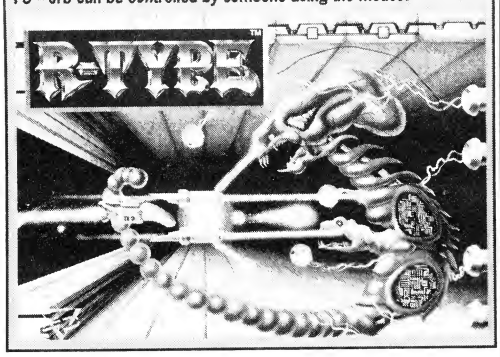
● **Vektor Graphics** in Leeds is currently working on *Bomber*, a 3D "high action" flight simulator. The title will be handled by Activision. According to Vektor, several other 3D games are on the way.

R-TYPE of game

What a game, but what a *** to complete. Impossible without a little underhand help.***

When you're asked to insert the second disk during loading, do the following: press [HELP], type 'ME' and press the up arrow key. After that, insert the second disk and press the space bar to continue. During the game pressing the function keys toggles various cheats:

F5 – invincibility from walls and aliens.
F6 – invulnerability from alien fire.
F7 – infinite credits.
F8 – orb can be controlled by someone using the mouse.



● **A new freeware C compiler** called *Sozobon C* is being distributed by the South West Software Library. The package includes an optimiser, assembler, linker and numerous utilities. The full K and R C specification is supported. It's available from South West (0703 229041) on one double sided disk – with the source on another. Cost per disk is £3.

● From the beginning of April, **Photophile** will expand its service to cover STs. You supply a photograph of the item you want digitised and in return you get a disk with a file containing the grabbed picture. The file can be in either *Neochrome*, *Degas*, *Doodle* or *Art Director* format. The cost is £1.50 per colour picture and £1 per black and white. A further £2 for each disk and £1 to cover postage. Details on 0602 481997.

● **Rombo Productions** has moved. The new phone number is 0506 414631.

Adrion McHerriot

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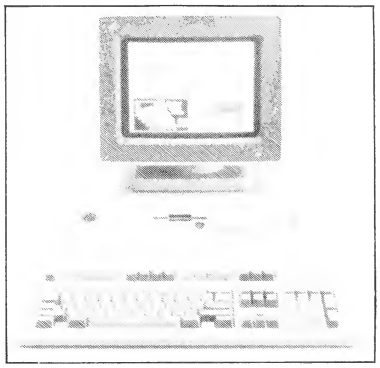
PC UPDATE

What price IBM?

Amstrad started life in computers by undercutting on prices and offering reasonable quality, thus providing excellent value for money. This continued from the CPCs, through the PCWs, to the PC1512 and 1640. With the the new 2000 range of machines, though, the company made a conscious decision to go for a higher spec and aim for the corporate market. The new machines have 3.5" drives, VGA screens and a higher entry price. The bottom of the range 2086 machine has been pitched straight at the entry level IBM PS/2 machine, the Model 30. Amstrad's adverts have majored on a direct price comparison.

IBM has now cut its dealer price on Model 30s, for those who can buy in lots of 50, so we should start to see Dixons and other major players offering them for around the £800 mark. At this level, they compare well with the PC2086. You have to consider whether you value Windows and a VGA screen (Amstrad's bonuses) more than a better second-hand price, probable better warranty and a metal case.

Will this price cut hurt IBM? Well rumour has it that a PS/2 Model 30 costs IBM less to build than an Amstrad PC1512, let alone a PC1640 or PC2086. If you look at the relative complexity of the circuit boards, you can see why.



• IBM's model 30: Now cheap enough to challenge Amstrad?

DOS extras

As the first in yet another occasional series, how about those utilities supplied with MS-DOS which few people use to their fullest extent? There are a lot of goodies available from DOS worth getting to know. For the purposes of this item, I'm working with PC-DOS version 3.3, but any version above 3.0 should have the same utilities.

COMP.COM: Compares two files, byte by byte, and reports any inconsistencies. Useful for comparing a copy of a file with an original. Type:

COMP <name of first file> <name of second file>

DISKCOMP.COM: Extends the comparison to the disk level. Compares two floppy disks and is again helpful in checking a copy with the original. Could also be useful for checking for virus infection, though you'd have to be sure that your source disk didn't already have the virus on it! Type:

DISKCOMP <name of first drive> <name of second drive>

Paperback writer

If you read the trade computer press, or bought software from Amstrad in its early CPC 464 days, you'll know the name of William Poel. Never one for a quiet life, Bill left Amstrad some years back to start up NewStar software and has since gone on to champion the cause of such products as *VP Planner, Multiwriter 2* and *TopDOS*. His latest catalogue, which includes products from the publishing arm – Paperback Software – is well produced and provides a more than reasonable amount of information. It's worth ringing (0245) 265017 to ask for a copy.

Simon Williams

Jargon jungle

To continue with a few of the common terms in PC usage which may confuse or befuddle:

SPEEDS: Whenever you see a speed quoted in a PC spec, it normally refers to the length of time it takes the central processor (8088, 8086, 80286, 80386 – see last week) to execute one instruction. Speeds range from 4.77MHz to 25MHz or even 32MHz. In other words, processors can typically perform between 5 million and 32 million instructions per second. The speed of everything in the PC, including the central processor, is controlled by a crystal clock, and each unit of time is therefore known as a clock cycle or tick.

Other things – such as processor type – being equal, a machine which runs at 16MHz goes twice as fast as a machine running at 8MHz. This doesn't necessarily mean the PCs housing these processors will show the same difference in speed, though. Other factors have an effect, particularly the speed of the memory chips. Most machine-code instructions involve fetching data from or putting it into locations in memory. If the memory takes a long time (in computer terms) to respond to the central processor's request, the processor may have to wait for one or more clock cycles each time it it uses memory. If it has to wait for one clock cycle, the whole machine is said to be a 'one wait state' system. If it never has to wait, the system is 'zero wait state' – the ideal situation.

HARD DISKS: There are two main factors governing hard disks; their capacity and their speed. Their capacity starts at around 20Mb and can go as high as 300Mb for very large PC systems. A 20Mb hard disk will give you the same sort of capacity as around 50 360K floppies, 17 1.2Mb floppies or 14 1.44Mb floppies. Check the programs you use regularly and the amount of floppy disk space they take up. You should be able to work out the size of hard disk you need. In practice, Murphy's 2nd Law of Computing applies.

The speed of a hard disk sffects a PC much as the speed of memory does, but to a greater extent as a hard disk is much slower to start with. Typical speeds are 65ms – slow, 28ms – quite fast and 15ms – very fast. The other factor affecting speed is the type of interface. Most PC interfaces are referred to as MFM. This standard is fine for medium sized disks (say, up to 40Mb). Disks of over 100Mb benefit from an ESDI interface, which has long been used in mini-computer systems.

MURPHY'S 2ND LAW OF COMPUTING: States that however much memory or disk space you buy, it's always less than half what you actually need.

AMIGA BLIT

Epyx to release Amiga portable?

Latest news (gossip and rumours actually!) from the States indicates that Epyx, the giant leisure software manufacturer, may be on the verge of releasing a hand-held portable based around the Amiga.

No details have yet emerged about the new machine, but informed opinion seems to indicate that the new machine is aimed primarily at the leisure market. When I phoned Epyx in the States (but don't tell my publisher, will you!), I was unable to get anyone to even confirm or deny the machines existence.

Many industry watchers have been predicting the arrival of the new machine ever since Epyx had supposedly managed to poach Jay Miner, the designer of the Amiga custom chips, and other such Amiga personalities from Commodore-Amiga Inc. when Commodore shut down the Los Gatos-based company.

AmiExpo Latest

Well, the latest AmiExpo in New York has come and gone, and already news of some exciting new products has started to filter through the usual gossip channels that computer journalists rely on so much. Several major companies in the Amiga market used the show as an excuse to either preview or launch new products.

Gold Disk was previewing the latest addition to its range of PRO series products, a new word processor and outline processor, in a similar vein to New Horizons' *Flow* idea processor.

NewTek, that company that gave the World Digi-View, released the latest update to its highly-acclaimed HAM paint package, *Digi-Paint* which is called, not surprisingly, *Digi-Paint 3*. Also shown at AmiExpo was its much awaited video digitiser/genlock/effects unit, Video Toaster (see snippets section for more details).

NewTek's greatest rival in the video digitisers market, A Squared Inc. (producers of the Live! digitiser), released LIVE! 2000, a combination genlock and video digitiser for the Amiga 2000.

ReadySoft (of *Dragons Lair* fame) released several new games, but probably the product of most interest from ReadySoft was its hardware-based Macintosh emulator. The company also released a rather obscure device that allows you to backup your valuable hard disk data to standard VHS video tapes. Such backup devices have been available for machines like the PC for quite some time, but this is the first to find its way onto the Amiga.

Video Titling made Easy

It is generally acknowledged throughout the video industry that the Amiga is the number one buy for any potential videophiles on a tight budget; why buy a machine such as the Quantel Paintbox when the Amiga can produce some very acceptable results for a fraction of the price?

However, one common complaint that many first time users have with professional video software is that it can often be almost incomprehensible to the average human. Many would even argue that calling a product professional is only a marketing ploy to gloss over the fact that the program is actual almost impossible to use!

You can therefore appreciate how overjoyed I was when a new piece of software landed on my rather untidy desk. *Video Generic Master*, from HB Marketing, is the ideal solution for any of you budding video enthusiasts that wish to use your Amigas to add fancy titles to all those home movies. The program is a powerful video titling package that contains a whole host of powerful facilities such as multi-direction scrolling, fonts right upto about 70 point and a lot more besides. But best of all... it's very easy to use; even a friend of mine who owns an ST worked out how to use it!

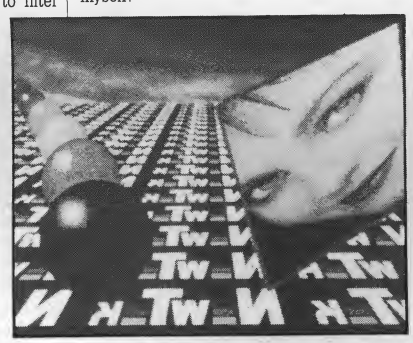
Video Generic Master is £69.95. For further details you can contact the distributors, HB Marketing, on 0895 444433.

Message Port

Have you got any opinions on any issues discussed within AmigaBLIT, or about any aspect of the Amiga scene in general? If so, Id love to hear from you. Likewise, if you've got any handy hits, tips or pokes for any software packages on the Amiga (infinite lives in Deluxe Paint!?) that you think would be of use to other Amiga owners, then why not send those in as well? You can contact me at the following address: AmigaBlit, New Computer Express, 4 Queen Street, Bath BA1 1EJ.

Snippets....

● If you're eagerly awaiting the arrival of MicroIllusions' follow-up to its highly regarded HAM paint package *Photon Paint*, then I'm afraid you're going to have to wait just a little bit longer. The European distributor, Activision (Oi! where's *MusicX*?), has had to postpone the release until at least the end of March. Is Activision trying to avoid a direct head-to-head confrontation with Electronic Arts' *Deluxe Paint* version 3, I ask myself?



• Look out for some very hot new products from NewTek over the coming months!

● NewTek, the company that brought you *Digi-View*, is soon to release its much talked about Video Toaster Unit. The Toaster is a real-time HAM video digitiser, broadcast quality genlock and video effects unit which is aimed primarily at the professional video market. Currently, only an American NTSC version exists but NewTek is claimed to be working hard on a PAL version.

The price of the Video Toaster is currently undecided, as the final deciding factor will undoubtedly be the price of the DRAM chips employed by the unit. If DRAM prices do fall, then expect to be paying just under £1,000 for the hottest piece of hardware available. But if prices stay at their current astronomical level, then the Video Toaster will probably end up with a rather hefty £1,600 price tag.

Jason Holborn

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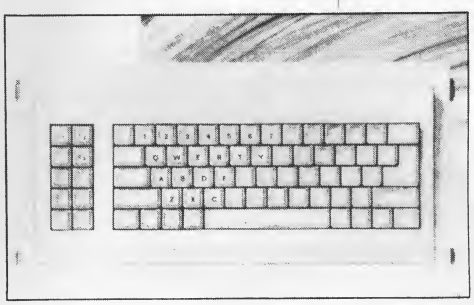
SPEX

Coupé de grace

After an eternity or three it's good to see Miles Gordon Technology's Spectrum-compatible is finally readying itself for launch onto the market, hopefully to cries of jubilation from the crowd.

The report in the latest issue of *ACE* on the unveiling of the first ever SAM suggests the finished product is every bit as good as originally claimed. It's cheap, has a wide range of expansion possibilities (including MIDI), an excellent BASIC language as standard and four different modes; each one impressive in its own way. Power Without the Price if ever I saw it.



• MGT's SAM Coupé: Too good to miss?

And yet, much as I hate to be a wet blanket, you can't help thinking that with all this talk of sooper dooper new games consoles, the SAM Coupé has been shoved out of the limelight and given a bit of a back seat (no doubt a jiggly, hydraulic one just to rub it in). It couldn't really have been launched at a worse time. The current climate in computerland seems to demand more and more innovation with the release of every new piece of hardware.

MGT's baby is not going to be revolutionary or ground-breaking, admittedly, but it is a well-balanced design which deserves some success. The firm behind SAM is good news for us humble users, too. It knows and loves the Spectrum and has heaps of enthusiasm and commitment. The complete opposite of Amstrad, in fact! (Libel suits, writs etc to the usual address.) Us Speccy owners are pretty fortunate to be getting a new and impressive computer late in our machine's life. You're not going to waste the opportunity and buy one of those amazingly expensive Amigas are you? Glad to hear it. Now I want that in writing.

Heroic tips

If you enjoy collecting examples of poor writing, in addition to *SPEX* and *The Sun*, invest in *Heroes of the Lance*. A sadder piece of contrived rubbish than the storyline you will not find.

I suppose the actual plot isn't at all bad, it's just the names. From what I can make out, the aim of the game is to help the inhabitants of Krynn before opposition to Takhisis can be united by recovering the Disks of Mishakal from Xak Tsaroth. Oh, and by the way, they're being guarded by Khisanth and enslaved Aghar, and even those dastardly Xynktrbzogs are in on the act (the only good Xynktrbzog is a dead one, I always say).

So it looks like your party of adventurers, which includes Tanis, Caramon, Majere, Tasslehoff Burrfoot and Sturm Brightblade (I bet they got some stick at school), will have their work cut out. The authors must have used *The Stupid-Sounding Random Fantasy Name Construction Kit* for some of those!

Anyway, talking of rubbish, that intro is really meant to introduce some tips for the damned game (which plays a lot better than it sounds):

- First and foremost, don't think you can get away without making a map. I know it's time-consuming and you always start at the wrong edge of the paper, but do it for me, will you?
- It might seem obvious, but arrange your party according to strength and armour. Good old Flint Fireforge makes an excellent frontman.
- Don't bother testing for traps. I found if you keep running they can be avoided fairly easily.
- Firing a few arrows at the baddies is greatly preferable to taking them on at close range. Use Tanis, and try to get shots in as quickly as possible; you can't move when shooting.
- Killing Trolls (at last, a name I can pronounce!) is best done with a torch. Not very partial to heat, these chaps.

Old dinosaur

Remember *Bubble Bobble*, that adorably cute platform-style game where you zapped the bad guys by trapping them in a bubbles and popping them? If only real life was as simple. Well, anyway, a Spectrum sequel called *Rainbow Islands* is on its way. Again, it looks adorably, bordering on the sickly, cute, and as we speak is being grafted over by Craftgold.

Also on the conversion road to your Speccy is *Renegade III*, which looks like being another mega-violent beat-em-up (would you have it any other way?), only this time the action is set in prehistoric times.

On the other hand

Last week I told you the Spectrum was going to be catered for at that glamorous show-biz event The Northern Sinclair Show. And if that wasn't enough, we will also be represented at the one, the only, Alternative Micro Show.

I promise to make absolutely no jokes about the Oric, Memotech, Enterprise and Texas owners that will also be at the Horticultural Halls on the 1st of April (yes, honestly). I like to think I can relate to them in some ways – you see my brother used to own a Colour Genie! Seriously though folks, I hope it turns out to be as big a success as the last one. Phone 0473 690729 for details.

The (nearly) infamous Speccy!

I hope you all read Graeme Kidd's excellent retelling of the Spectrum story in *Express* 17. Those who didn't, write "I will not miss an issue of *Express* again" one thousand times and get your order into the back issues department immediately.

I must confess it did throw up a few things I wasn't aware of. The fact that the Spectrum was a contender as the official BBC computer, for example. It doesn't bear thinking about. Imagine how humiliating it would be to see our machine alongside Fred Harris on one of those awful 'home micro' programs they show on BBC2 at 3:19am just to make sure no-one will watch. A lucky escape, no?

Robin Alway

SECTOR 64 SECTOR

Coming soon...

Tyger Tyger ▪ Firebird ▪ £9.95

We saw an early version of this game briefly at last year's PC show, and have been anticipating its release ever since. Written by ex-Compunetter Gary Liddon and with stunning graphics by Paul (Dokk) Docherty, this game looks destined to become a hit. Look out for it, as it should appear in the shops soon.

BASIC RAM listing

This listing wipes out the BASIC RAM, allowing changes to be made with BASIC.

```
0   SYS49408:B=49408
1   RESTORE:FORL=0TO39:READA:POKEB+L,A:NEXTL
9   DATA 162,0,189,0,160
10  DATA 157,0,160,232,208
20  DATA 247,238,4,193,238
30  DATA 7,193,173,7,193
40  DATA 201,192,240,3,76
50  DATA 0,193,169,160,141
60  DATA 4,193,141,7,193
70  DATA 169,54,133,1,96
80  REM CHANGE READY TO FINE!
90  B=41848:FORL=0TO4:READA:POKEB+L,A:NEXTL
91  DATA 70,73,78,69,33
100 REM CHANGE POKE TO KILL
101 B=41210:FORL=0TO3:READA:POKEB+L,A:NEXTL
102 DATA 75,73,76,204
110 REM CHANGE PRINT TO ASCII
111 B=41220:FORL=0TO4:READA:POKEB+L,A:NEXTL
112 DATA 65,83,67,73,201
```

The POKE command is now "KILL", PRINT is now ASCII "HELLO" and READY message is now "FINE".

Pinball Simulator ▪ Code Masters ▪ £2.99

This has been written by Christian Shriggly, the former brains behind Gremlin Graphics and some neat CNet demos a long time ago. As to what the game's about – well, we guess it speaks for itself.

Rock Star Management ▪ Code Masters ▪ £9.99

A game in which you can tame people like Wacko Jacko (or maybe Tina Turner...). Sounds quite original, but we'll have to wait and see.

Rally Cross Simulator ▪ Code Masters ▪ £2.99

This game takes place from an overhead viewpoint, with you rallying against all odds. Written (it has to be) by Gavin Rauben, the guy behind a lot of Power House and Code Masters games today, it's got to be worth a look. There's always something in his games that makes you want to keep playing.

Birth of a legend

C64-ers in search of a little bedtime reading should check out a book called *The Home Computer Wars*. Written by Michael S. Tomczyk, Jack Tramiel's one-time assistant, it charts the four years up to and and just after Jack Tramiel's departure for Atari and – specifically, the birth and development of the Commodore 64.

Published at $9.95 in the states, any good bookstore should be able to order you a copy if you quote them the ISBN number – 0-942386-78-7.

Sexist or what?

A subject recently brought to light once again is that of sexism in computer games. Recent game releases such as *Emmanuelle* and *Teenage Queen* on the 16-bit machines have provoked letters in various computer magazines. With the arrival of the Amiga and Atari ST, the sexist games market has never been better – due to these machines' ability to produce lifelike images.

In the days before the 16-bit invasion, several companies produced various strip poker-type games, but due to the graphic limitations of the weaker 8-bit machines, these games could never be considered realistic, and were no (arguably) worse than something to have a laugh about with your mates. Digitised pictures on the 64 are very mess, and the computer images in Martech's famous poker game from a few years ago bore little resemblance to Samantha Fox.

It was inevitable, though, that such games would arrive on the more powerful Amiga and ST - given their far superior graphics capabilities, and these are the versions that have provoked the controversy.

But is this controversy deliberate? Is it a marketing device on the part of the software houses? The fuss over these games only serves to make people curious – perhaps curious enough to go out and buy the product.

There is a clear majority of male computer users over females out there, agreed. Hardly an ideal situation - and is it likely to change if software stays male-dominated? But then maybe Anco has the answer, with its special *Strip Poker* data disk bearing (!) the charms of Lee and Roy...

Ian + Mic

• Emmanuelle on the Amiga: Are the 16-bitters to blame for sexist software?

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PCW PATCH

MoRE ACRoNyms

Why haven't we seen any OOPs on the PCWs yet? You know, Object Oriented Programming, though what the acronyms stand for is becoming increasingly irrelevant as long as they can be pronounced; for example no one now living can remember whether SPOOLER is an acronym or not (but if it is I know what it stands for).

The idea behind OOP is that a chunk of code and the data it works on is treated as an object that you can send instructions to, use as part of another object or just save for a rainy day.

For example you might have an object called Menu that knows all about the PCW screen enviroment, how to save a bit of it, pull down the menu, collect your choice and put the screen back. This is quite a lot of work and well worth using again; an OOP language makes this kind of thing easy to re-use. This is only a tease since it seems unlikely we'll get one.

I can C, I can C!

Hisoft is easily the best programming houses anywhere, and its range of languages for the PCW offers unbeatable value. Since I like to be thought fashionable I program in C even when it would be easier to do it in something else (or not at all) and *Hisoft C* is the version I use (I know notheeng – so don't write in with your problems). Instead look at this:

```
main()
{
int a,b;a=5;
power(a,&b);
printf("%d %d",a,b);
}
power(c,d)
int *d;
{
*d=c*c*c;
}
```

According to Kernighan and Ritchie (who wrote C) this shouldn't work – the variable c isn't declared in POWER yet we use it anyway – but it works perfectly under both *Hisoft C* and *Zortech C*. Any others? And since it's answers time, when is Hisoft going to release a version of C for the PCW with floating point numbers? Write to Hisoft and ask.

Steve Patient

Seriously interesting

In contrast to our more upmarket (that is to say, expensive) computer brethren browsing among the PC contemptibles, the PCW encourages a more realistic estimate of the pocket depth. There is a surprisingly rich undrgrowth of fine, homegrown, programs appearing for the PCW. Fortunately, they aren't all accounts packages.

In recent weeks two have caught my eye; Gilligans Guide, based on the Ordnance Survey maps and providing a wealth of information in graphical form on various parts of the country (new areas to order for only £30), and an astronomy program that displays any part of the night sky from any part of the Earth at any time. Both of these will soon be covered in detail in the pages of the very wonderful 8000 Plus.

QL corner

Packet radio

Several QL users who are also licensed radio amateurs are using their QLs for packet radio, in conjunction with a 2 metre transceiver, and a box of tricks called a Terminal Node Controller (TNC) that is fitted between the computer (via the RS-232 port) and the transceiver.

The TNC contains a modem chip and a powerful Z80-based microcomputer that takes data sent to it from the computer, converts the data into "packets", with checksums and destination addresses, and sends the packets, via a network of other packet stations, to the destination. The same process occurs in reverse when one receives data from another station.

World-wide communication is possible, using amateur satellites and microwave links, and it is all absolutely free, once you have the hardware and software. Most QL "packeteers" use the excellent *QuaLsoft* terminal emulation program from TF services.

DIY QL

Quanta member Mike Lilley and his brother have designed a printed circuit board about the size of an A4 sheet of paper, that takes all the plug-in chips from a standard QL, plus quite a few other components. The result is a fully QL-compatible computer with 512K of RAM, disk interface and parallel printer interface, with provision for several EPROMs and special-purpose interfaces (like and analogue-digital converter).

Six of these systems have been built so far, with relatively few problems in most cases.

Ancient history

The QL is about six years old this month. It's difficult to be precise about its exact age, as it had a rather troubled gestation period, and arrived prematurely.

The happy event was attended by hordes of hacks and hackettes who wetted the head of Uncle Clive's new baby with copious amounts of bubbly at a celebratory breakfast, and subsequently wrote glowing reviews of the new arrival in spite of the fact that no-one was allowed to actually play with it. Watch next week's Express Micro Biography for the full story of the QL...

New C compiler

PDQL is advertising a new C compiler for the QL.

Unlike the Digital Precision product, the new compiler is a full implementation of the language, and is in fact identical to the latest release of the *Lattice C* compiler for the Atari ST range, with a new QL-specific library. In fact, the QL emulates the ST when it runs the compiler.

This does not mean that you can run ST software on the QL, by the way. This compiler is ideal for use with the *SuperBASIC*-C translator mentioned a couple of weeks ago.

John Torofex

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The virus is spreading...

That is, according to a correspondent who gives his address only as 'The Micro Kid, Hackers UK Ltd, England'.

This nerd claims to have placed a virus on his school's Econet network. Proud of this dubious achievement, he then goes on to offer me a tip for the column.

Well, firstly mate, you can't place a true virus on Econet. Secondly, I am not going to publish your tip. And thirdly, I have passed your details back to your school.

He finishes his letter with "That's all for now until my next tip", so I might add, "That's all until my next tip-off!"

Many a good tune

If you have ventured down to your local pub recently, and seen one of these curious-looking CD jukeboxes, then you could well have been looking at a Master 128 in disguise.

Also featured on Arena last week, the jukeboxes have already sold over a thousand units. The venture looks set to be a major success for Acorn, which has provided the computers that form the heart of the system, and the power to access around a thousand tracks of digital music.

Why pick a Master? Well, in the words of Joanne Arbiter, MD of Arbiter Leisure, "inherent reliability and robustness".

Dragon emulator?

Things seem to have woken up recently from their post-Christmas torpor, with a veritable deluge (well, trickle anyway) of new material onto my desk.

ESM keeps 'em coming with *Puff*, which is one of its educational adventures for kids. I must admit that I was enchanted by the story of a dragon who can't fly any more.

I was less enchanted by the software, which is plain and simple both in presentation and format. However, it will do the job required, which is to help children learn English and arithmetic.

Sam's back

Superior is also keeping it going with *Play it Again Sam 7*. Now it should have been available for a while by the time you read this, so I am not going to bore you with a review. But what I will do is keep you posted on the Electron compatibility of *Firetrack*. If it plays well, then it's a must for Elk fans. One can only guess why these things were never converted before.

Terminal mess

At the *Which Computer?* Show I was somewhat surprised – and pleased – to spot two Master computers on the Acorn stand.

Both were doing duty as terminals on a hybrid Econet/Unix system, but to be quite honest they would have been better standing alone judging by the mess the system was in, with worried-looking men trying to trace the signal with a multimeter! Still, it does demonstrate the flexibility of this eight-year-old computer.

Andrew Brown

MSX TRA

MSX digitising

A couple of weeks ago *Express* did an article on computers and video digitisers, and given that little information was available for the MSX user, I thought I would take this opportunity to cover the subject.

In Japan, MSX computers can be expanded and upgraded to do almost anything, so it comes as no surprise to find that you can purchase a cartridge that allows digitising and titling on even an MSX 1 computer. Unfortunately, this device only works on the Japanese TV system – this is why we have not seen it in the UK.

Luckily, you can still purchase the Pioneer PX 7 MSX computer at the ridiculously low price of £199.00, including titling software. This computer was originally £500.00, so it is a real bargain. The machine has all the usual MSX features, but also has two BNC connectors; one for inputing a signal from a camcorder or VCR, the other giving a "mixed" output for recording onto a second recorder. You can place text and graphics over your video, and can also use the inbuilt sound chip to add music or sound effects.

The only MSX computer available in the UK that can do full digitisation and graphic overlays is the Philips MSX 2 VG 8280UK, at just over £800. Now that Philips is no longer manufacturing these computers, they are soon going to be in short supply, as even at this relatively high price they are selling well.

For details of the Pioneer PX 7 computer, contact Videoquip, 5 Fosse Road South, Leicester LE3 0LP, or phone 0533 558818. For details of the Philips range of computers, contact **Nightdare Ltd, 11B Walnut Road, Chelston, Torquay, Devon TQ2 6HP**, Tel 0803 606146, or contact **Knights Computers, 108 Rosemount Place, Aberdeen AB2 4YW**, Tel 0224 630526.

Ghoulish tips

Richard Cross, of Bearwood Nr Bournemouth, has kindly sent in a few tips and pokes for the MSX gamesters amongst you. They are:

• For Ghostbusters, type in the name JON and say your account number is 1234 – you will be given an enormous amount of starting money.

• For Hunchback, before loading type in:

```
10 BLOAD"CAS:":poke -283700
20 DEFUSR=&H9000:A=USR(0)
```

Now run the program.

More of Richard's tips next week, and in reply to Richard's request for a free sub for all his hacking work – you've no chance mate. Even I have to buy my own copy of the mag each week.

More games

The MSX software scene is still thriving, with many games in the pipeline. Some to look out for are: *Superman* from Tynesoft; Scape Ghost from Level 9; *System 8* and *Turf Form*, both from CDS Software; *Thunderbirds* from Grandslam. *Crazy Cars* for the MSX 1 and 2 is now out on cartridge, and I have a copy in my possession courtesy of Titus software. It sells at £24.95, so is not cheap. Watch this space for my impressions of the game.

Keith Neal

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CPC centre

CPC's never had it so good

Now look here, I'm getting pretty sick and tired of all these references in the computer press to the 'poor old CPC' and its imminent extinction. It's been going on, like a particularly uncomfortable background noise, for a long time now. Like many a self-fulfilling prophecy, however, the cumulative effect is to undermine confidence and give people the impression that there must be fire to accompany the smoke.

What's prompted this little outburst (ooh I love it when you're angry) was the news story in this very organ last week (p.6) that nailed the 'bye-bye' nonsense once and for all. At least NCE hasn't fallen for the knee-jerk anti CPC reaction. So next time you hear someone sneering at your machine and predicting it'll go out of production 'very soon' – whether it's a journo, shopkeeper or 16-bit machine owner – hit 'em with a clip from last week's NCE and a few of the following facts. They'll soon feel as if they've gone four and three-quarter rounds with Iron Mike.

- **fact one:** the most recent Gallup figures indicate that more CPC games are bought than Commodore 64s.
- **fact two:** the same figures show that considerably more than twice as many CPC games have been bought this year than Atari STs and Amigas put together.
- **fact three:** despite thoughtless assertions that 'hardly any' games get converted for the CPC any more, all but four of last week's All Formats Top 40 are available in an Amstrad version.
- **fact four:** the leading CPC-specific magazine, Amstrad Action, has just returned readership figures for the second half of 1988 up from 35,000 by very nearly 10 per cent.
- **fact five:** more CPCs were bought during the six months up to Christmas 1988 than in the same period of 1987.
- **fact six:** the 464 pcb has been redesigned, and some 6128 components have been integrated onto a custom chip.

None of these facts suggest to me that the CPC is fading fast, or that it's about to go out of production. Mr Sugar isn't interested in what fashion says, or what computer journalists tell him he ought to be doing (that includes me, of course!). But if something sells he'll sell it.

SHARE OF SALES BY M/

Machine	Units sold (%) This week	Last week	4 wks ago
SPECTRUM	40.4	40.1	40.9
AMSTRAD	21.0	20.1	19.2
COMMODORE 64	19.8	20.8	19.7
ATARI	5.0	3.4	4.4
ATARI ST	4.6	5.1	5.4
AMIGA	3.7	4.3	3.9
BBC	1.7	1.7	1.7
ELECTRON	0.9	0.9	1.0
COMMODORE 16	0.6	0.8	1.0

AVERAGE SALES PER P

	Units Sold This	Last	4

• Is the CPC on the way out? Not according to Gallup!

Wheel be out soon

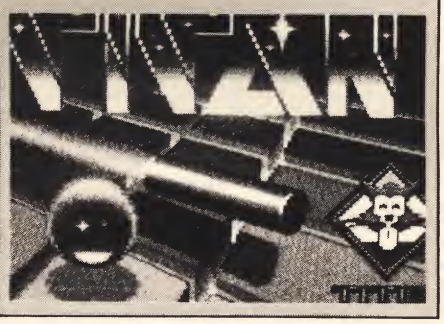
It was only a couple of weeks ago I was telling you about Microleisure's rather terrific Star Cursor arcade-style joystick. Now comes news of something even more exciting in the usually staid and uninteresting waggling department. It's a steering wheel device which plugs directly into your CPC joystick port. As yet it's only available in the States, but plans are fairly advanced for its release this side of the water. I'm not allowed to show you a picture yet, or give details about who's selling it, but I can tell you a) it'll cost about £35, b) I've tried it, and it certainly brings a whole new dimension to driving sims and similar games – WEC Le Mans is even better when you're really steering! and c) Amstrad Action has five of the things to give away in a competition featured in its May issue (out on April 13th). They're to boost Entertainment International's release of Crazy Cars II, coming soon, as they say, to a small screen near you.

Steve Carey

Titan poke

Neville Short has sent in an infinite lives poke for the Titus hit.

```
10    TITUS POKE - DISK
20    NCE MARCH 1989
30    BY N. SHORT
40    HELLO DAVE
50    MODE 0:BORDER 0:FOR I=0 TO 15:READ A:INK I,A:NEXT
60    OPENOUT"A":MEMORY &7FF:CLOSEOUT
70    'LOAD"!TITAN1",&C000
80    LOAD"!TITAN2",&800
90    MODE 1:LOCATE 3,12:PRINT" INFINITE LIVES (Y/N)?"
91    A$="":WHILE A$="":A$=UPPER$(INKEY$)WEND
92    IF A$="Y" THEN 100 ELSE 110
100   POKE &1A19,0:POKE&1A1A,&CA":'INFINITE LIVES
110   MODE 0: FOR I=0 TO 15:INK I,0:NEXT
120   LOAD"!TITAN3",&C000
130   RESTORE 150:FOR I=0 TO 15:READ A:INK I,A:NEXT
140   RESTORE 160:FOR I=0 TO 14:READ A$:
      POKE&4000+I,VAL("&"+A$):NEXT:CALL&4000
150   DATA 0,26,13,20,14,2,1,24,12,15,6,3,19,9,16,25
160   DATA F3,23,00,C0,11,00,80,01,00,40,ED,B0,C3,00,10
```



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- A description so that you can see what each transaction was for, e.g. "New gearbox" or "Box of 10 discs."
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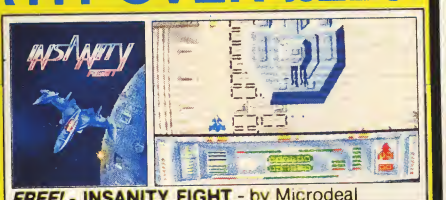

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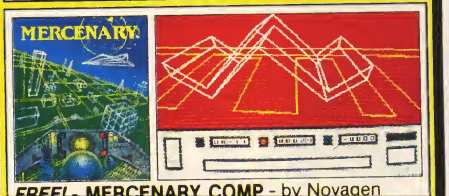

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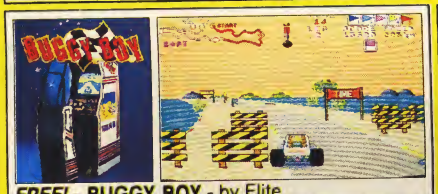

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Is there any truth in this or can I make all my disks flippies?

T. S. Yeo, Dunbartonshire, Scotland.

• As long as you make a clean cut into the cardboard sleeve of the disk you intend to convert to a flippy, or use a commercially available disk notcher (try mail-order advertisers, should be around £5), you shouldn't have any problems. Be aware, however, that if you make this modification to a floppy designated as being single-sided, then the integrity of the data on the flip side cannot be guaranteed.

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HELP!
STOS-er

In the next few weeks I will be buy-ing S.T.O.S., and would appreciate a few answers to these questions:

1. Is it possible to join three or four sprites together to make one large sprite character such as a boxer, and would it be fairly easy to animate him and control him by joystick?

2. Would it be possible to create a boxing simulation incorporating artificial intelligence, so that the computer boxer would act on any mistakes the other boxer makes?

3. How may frames of animation are needed to make fluent movement?

4. Could a person with a peanut sized knowledge of BASIC be able to get along with the S.T.O.S. programming language without too many problems?

Tarquin Burnett, Harlow, Essex.

• *STOS* allows a sprite size of 64x64 pixels to be defined and manipulated with the sprite editor. For larger characters, it is possible to join several sprites together, to make one large sprite. To animate a single character made up of several sprites, you will need to use a method known as page-flipping (fully explained in the *STOS* manual). The whole character can then be moved quite easily using a joystick.

The logic of the *STOS* programming language is very similar to that of C and machine code, so it shouldn't be a problem to incorporate some degree of 'intelligence' into your boxing character.

To achieve smooth movement of your figures, use between four and eight frames of animation.

The wizards (!) at Mandarin software tell me that it is very easy to master *STOS*, and to encourage your efforts, they are currently offering the sum of £5000 to the games-writer of the year: Get programming!

TIP
A Little Bored, Fontleroy?

I read with interest the tip printed in issue 16 regarding Amiga fonts. However, the tip as printed is almost unusable. The standard AmigaDos file which goes with every "The Very First" font is such that the Amiga thinks there are many more point sizes than actually exist in the font directory. This means that if the fonts are copied directly onto a disk such as *DPaint*, the font menu becomes so large that the program will crash. The solution lies in using the font editor and the AmigaDos 'assign' command. Assign the font directory to "The Very First" disk then run FED. Load a font (remember, all font sizes are the same), return to the workbench screen and your CLI window, and ASSIGN the font directory to one belonging to your destination disk. Now save the font. Repeat this process for each font. This is the only method which produces a usable set of typefaces.

A much easier way of extending your Amiga's font selection is with the aid of Fish Disk No. 135. This contains a huge amount of fonts to transfer to your other programs. At last, the garish *Workbench* typefaces can be replaced by decent Times Roman and Helvetica fonts, albeit under different names. Some of them are over 160 pixels high, and there are options to reduce the characters to just upper-case, numerals, etc. The disk is obtainable from George Thompson Services. Tel: 077082 234.

Niall Caldwell, Glasgow.

TIP
Monitoring progress

In response to the enquiry from Clive Bentham (issue 15), I have detailed below the method I used very successfully to attach an Atari ST to an Amstrad monitor. I must say at this point, that this information has been culled from several sources, all I've done here is to pull it all together.

All you need is a standard Atari monitor lead, and Amstrad six pin DIN plug, two general purpose diodes (OA91 from Maplin), and some 280 or 300 ohm resistors.

Remove the Atari monitor plug and bare the wires. Solder one of the diodes in line on both the horizontal and vertical sync wires (pins 9 and 12), making sure that the marked end of the diode points towards the monitor. These two wires should now be joined together.

Solder one of the resistors to each of the green, red and blue wires, pins 6, 7, and 10 respectively (colour references relate to signal colour, i.e. RGB, not the colour of the wire).

Now connect the necessary wires to the Amstrad six pin DIN socket, using the following configuration: Atari pin 7 to Amstrad pin 1. Atari pin 6 to Amstrad pin 2. Atari pin 10 to Amstrad pin 3. Atari pins 9 and 12 (now joined) to Amstrad pin 4. Finally, Atari pin 13 to Amstrad pin 5. Pin six on the Amstrad is not connected.

Angus MacQueen, Duston, Northampton.

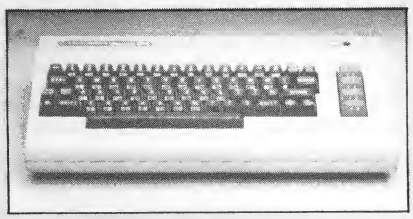
TIP All the angles

Everyone knows that the Commodore 64 is the best eight-bit computer in the world (*Excuse me, I'm due back on the planet Earth – Tech Ed*), but when it comes to games, they can be a teensy bit temperamental. To cure this rather annoying problem, here is a cheap circuit to help with adjustment of the azimuth angle (*The azimuth angle is the position of the read head of the machine, relative to the tape – Tech Ed*).

You need a small speaker - one from a personal stereo mini-speaker is ideal. Wire it to your 64 via a six pin DIN plug (Tandy sell one for about £1). Take the two wires from the speaker and solder one to pin one and the other to pin five of the DIN plug (it doesn't matter which wire you use for each).

Now place a game that you normally have trouble with in the commodore tape deck and press play. As soon as you can hear the game, place a small Phillips screw-driver in the hole in the tape deck, and adjust the screw. As you turn the screw, the sound quality from the speaker will change. Keep turning the screw, until the sound is the best quality you can get. The game should now load without any problems.

Leigh Haynes, Grimsby, Sth. Humberside.



• The Commodore 64: Best 8-bit micro in the world or a pain in the azimuth?

TIP
RAM PACKed up!

A few weeks ago you had a query from an MSX user who was having trouble using a RAM pack. I can explain why the RAM pack appears not to be working.

The MSX uses a Z80 central processor, which as you know is an 8-bit processor with a 16-bit address bus. The maximum amount of memory the Z80 can access is 64k. To get around this problem, the MSX uses a clever system of 'bank-switching', enabling it to expand up to 4 megabytes. Unfortunately, all this memory can't be used from BASIC, but requires either MSX-DOS or machine code to make use of it.

Your RAM pack is probably OK, but appears not to be of much use to you, although if you are using a 32k MSX, then you should be able to use 64k games.

David Haslett, Blackpool, Lancs.

BUG OF THE WEEK

When you die in *Bionic Commandos* on the ST, wait until part of the parachutist disappears under the bottom of the screen right at the beginning of the game, then watch the screen scroll and display garbage!

Grant Robson, Bridge-of-well, Renfrewshire.

• Callistus lunatus
This ground beetle is related to the genus *Chlaenius*, but is easily distinguished by its conspicuous markings. The beetles are thermophilic, and are to be found chiefly on dry and warm chalky hillsides, to which they parachute in their thousands from altitudes of up to 20,000 feet.

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Here are the highlights of the previous issues – but remember they also contain all your regular favourites: news, games reviews, machine columns, beginners' guide, controversies, tech tips, letters, PSsst, vouchers etc etc.

Issue 1: Future of computing, PC graphics, revival of Basic, Xmas games
Issue 2: Which computer?, the perfect wordprocessor, Konix console
Issue 3: Portable computing, Alan Sugar profile part I, yuppie software
Issue 4: Sega's16-bit console, best value PC, games that change your life
Issue 5: PC 200 fiasco, DTP guide, computer art, Unix explained
Issue 6: MGT Coupe, careers in computing, Realtime profile, cracking
Issue 7/8: Best games of '88, review of the year, look forward to '89
Issue 9: Censorship controversy, classic computer problems solved
Issue 10 : PC software guide, Christmas games tips, Release Schedule wk 1
Issue 11 : CDI technology, choosing a printer, Alan Sugar profile final part
Issue 12 : Being a smart consumer, dyslexia and computers, Jack Tramiel story
Issue 13 : Konix console, da Vinci exhibition, best Amiga software, shareware
Issue 14 : Which PC?, PC Engine CD ROM, Hackers, Workbench 1.3
Issue 15 : MiniGEN, monitors, virus book reviews, Sir Clive Sinclair
Issue 16 : Music special, History of the PC, TV graphics, beginners's graphics
Issue 17 : Digitisers, programming languages, History of the Spectrum
Issue 18 : ST essentials, Hypertext, QuickBASIC review, History of the BBC

● This week heralded the arrival of a Pool simulation courtesy of Firebird. Fortunately *3-D Pool* manages to breathe new life into the boring old flat approach to a Pool/Snooker sim.

While on the strategic front, *War In Middle Earth* – based on The Lord of the Rings – should appeal to wargamer and Tolkien fan alike.

Interestingly, both of these titles were reviewed on the C64, which all goes to show there's plenty of life left in this old 8-bit diehard.

3D POOL

FIREBIRD

C64 £9.99cs, £12.99dk
Due out on ST, Amiga, Archimedes, Spectrum, CPC, MSX, BBC

Since CDS's *Steve Davis' Snooker* and Code Masters' *Pro-Snooker Simulator* cleaned up very nicely thank you, it would seem there'll be plenty of potters cueing up for shot at *3D Pool*.

● GAMEPLAY

Although *3D Pool* has options for two-player, demo, practice and trick shot modes, its main feature is a tournament in which you get to play the best of 3 games against 3 different opponents before taking on a sim of Maltese Joe Barbara, the current European champion.

There's no cue anywhere to be seen - instead you judge the shot by imagining a line from the cue ball to the centre of the screen. So instead of moving your cue around the table, the table moves around you. This is effected by simply moving the joystick. You can also move vertically for progressively more overhead views. The degree to which you get 'above' the table is deemed to signify the amount of top or bottom you wish to put on the cue ball. Holding down fire and moving the stick from left to right allows you to increase or decrease the power of the shot. Then it's a simple double-click to let fly. You may also zoom in or out of a position - particularly useful if the balls are packed tight.

The opposition get progressively stronger of course, and whilst there's no obvious bias in the ability of your sim opponents let's just say some of the shots they manage to pull off do have a certain flair!. Having said that, gameplay is great and emulates pool-play sufficiently accurately to be of good use on the real baize.

● GRAPHICS AND SOUND

Even on the C64 the graphics are impressive. Rotating shots can be zoomed and elevated whilst the balls are still in motion - a combination of code that probably eats up all the 64's processing power. Although the ball colours are either red or deep red, they're still sufficiently distinguishable to remove confusion. Sound is confined to the spot-effect of balls dropping into pockets.

● OTHER VERSIONS

Of the ones we've seen, the Archimedes version obviously wins hands down. Here you can almost believe you're dealing, with photo-quality graphics, and there's the added bonus of being able to cursor directly onto the exact spot on the object ball you want to connect with before making the shot. Otherwise all versions are very good and will no doubt sell in droves.

• Archie should look the same on the ST and Amiga

5 GAME

● EXPRESS VERDICT

A pretty neat pool simulator that uses solid 3D to full advantage and combines it with great gameplay. A game that'll have you dying to get out onto a real table to show off how much you've learned.

✪ ✪ ✪ ✪ ✪

Andy Storer

• BBC: Yes, even out on the good old Beeb

• C64 : Not bad eh?

OPERATION NEPTUNE

INFOGRAMES

ST • £24.95dk
Also on Amiga

Bob Morane's back on the beat again, though this time he's up against the Yellow Shadow down below.

● GAMEPLAY

Op Neptune is a sub-aquatic seek and destroy shoot-em-up with more than a little strategy, in which you must use mines to destroy a network of enemy bases linked by energy grids. You're working for the free world, and if all your bases, oxygen and energy disappear it's game over. In the meantime, new bases and links are being built all the time, and given protection ranging from mines to guard and war patrols. You have underwater scooters, decoy and time-bombs at your disposal, plus the chance to slip into rubber and engage in flippered fisticuffs – as well as a whole submarine to navigate – in a bid to rid the undersea world of the yellow peril.

● GRAPHICS AND SOUND

Neptune uses excellent graphics to depict the various locales and scenarios comprising the average gameplay. These begin with well-crafted animation screens which curiously descend into rather uniform underwater landscapes. Spot-effect sound is promising too, with the backing music score top-notch.

• We all live in a Yellow Submarine. Well, a sort of bluey-grey submarine, actually.

● OTHER VERSIONS

The Amiga version is a near identical outing to the ST, but benefits from slightly better sound effects and, of course, a stereo rendition of the impressive music score.

● EXPRESS VERDICT

An above-average variant on a strategic shoot-em-up, with neat graphics and atmosphere. Unfortunately, gameplay fails to deliver after more than a few loads, so it can't be recommended as an essential purchase at this price-point.

✪ ✪ ✪

Andy Storer

LEGEND OF THE SWORD

RAINBIRD

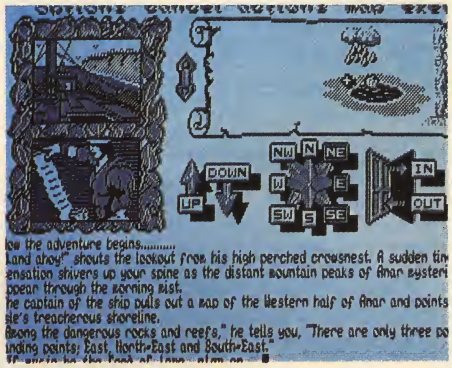
PC • £24.99dk
Also on ST, Amiga

***Legend*'s appearance on the ST back in August won wide critical acclaim for its original graphic presentation and humorous parser. Now out on the PC, how much of an adventure does it present?**

● GAMEPLAY

You and a bunch of five mercenaries are dispatched to the Anar, where you're after a sword with which you can slay a wizard. There are a variety of places, puzzles and pitfalls to occupy your time and a very neat twist in the tail.

Although there's nothing highly original about the scenario, it's the method of interaction which lifts *Legend* from the usual dross of wizard v warrior outings. Many common adventure commands can be fed in using the mouse, and your current and last location are displayed in two windows. There's also the traditionall


NW
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low the adventure begins.....
Land ahoy!" shouts the lookout from his high perched crosnest. A sudden tin
ensation shivers up your spine as the distant mountain peaks of Anar mysteri
ppear through the morning mist.
he captain of the ship pulls out a map of the Western half of Anar and points
is treacherous shoreline.
Among the dangerous rocks and reefs," he tells you, "There are only three po
anding points; East, North-East and South-East."

• The icon is mightier than the sword

means of interaction - you against the interpreter – and here you'll find a flexible and sophisticated parser that'll have you regarding it as friend rather than foe.

● GRAPHICS AND SOUND

Legend is unique in presenting an almost fully mouse-driven system complete with scrollable map and pictorial representation of found objects. A useful inclusion are direction icons which allow rapid movement between locations. As with just about every adventure in the universe, the only sound is that of the keyboard.

● OTHER VERSIONS

Both the ST and Amiga versions are well worth checking out, though there's not a great deal of difference between them and this outing.

● EXPRESS VERDICT

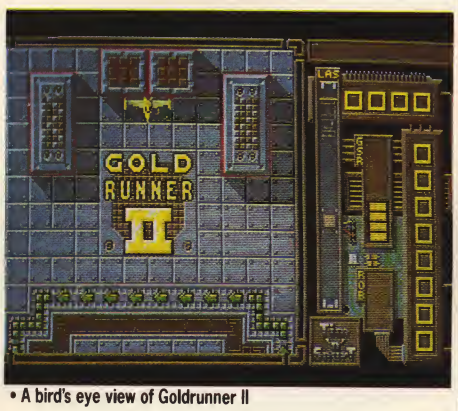
An adventure which will hopefully set the trend for future interactive games, but not necessarily in terms of scenario. In the meantime, a purchase for confirmed parser-punters only.

✪ ✪ ✪ **Andy Storer**

GOLDRUNNER II

MICRODEAL

Amiga • £19.95dk
Already on ST



• A bird's eye view of Goldrunner II

When *Goldrunner* first appeared in 1987 it achieved high acclaim for its state-of-the-art vertical scroll routine, a feature unfortunately negated by *Goldrunner*'s lack of gameplay. Now *Goldrunner II* is out, so has its predecessor's deficiency in gameplay been rectified or ignored?

● GAMEPLAY

Goldrunner II follows the standard route of the vertically-scrolling shoot-em-up genre, with objects to pick up, obstacles to avoid and aliens to shoot. It's done in a routine, painfully familiar way with nothing new, exciting or overwhelmingly addictive to justify prolonged play.

● GRAPHICS AND SOUND

Goldrunner II contains bog standard – if not stale – audio-visuals, with the only noteworthy feature being the extremely fast and smooth-moving vertical scroll routine already used in the original *Goldrunner*.

For those gameplayers who persevere, keep-on playing *Goldrunner II* and get bored with the backdrops, Microdeal is offering two add-on scenery disks costing £5.95 each.

● OTHER VERSIONS

Out first on the ST, *Goldrunner II* is more or less the same on the ST albeit with slightly inferior audio quality.

● EXPRESS VERDICT

Ouch! *Goldrunner II* is based around a technically brilliant smooth 'n' fast vertical scroll routine, with gameplay and audio-visuals somewhat of an afterthought – and does it show. Unplayable and monotonous gameplay coupled with less-than-inspiring audio-visuals add up to a rather forgettable shoot-em-up. *Goldrunner II* completely fails to compete with the excellent *Hybris*, *Sidewinder* or *Xenon*.

Goldrunner? More like golddigger.

✪ **Rik Haynes**

SCORPION

DIGITAL MAGIC SOFTWARE

Amiga • £24.95dk
Out soon on ST

Marking the debut release for a group of ex-CRL designers and programmers called Digital Magic Software, *Scorpion* is a horizontally-scrolling platform exploration-type game.

● GAMEPLAY

Taking on the guise of a Scorpion Warrior (complete with motorbike helmet), you must travel through five different levels in a quest to rescue the princess of Scorpia.

Along the way, you'll encounter all manner of hazards, creatures and traps – as well as extra weapon pick-ups – before your confrontation with each of the five end-of-level guardians.

● GRAPHICS AND SOUND

Scorpion contains a strange combination of visual influences such as your motorbike helmet-clad character taking on pirates, crabs and seagulls on a pirate ship in the first level. Which is fine if it had worked, but unfortunately it doesn't, due to its rudimentary backdrops and sprites, barely enlivened by a few visual tricks and enhancements.

Audio is made up of purely functional sound spot-effects.

● OTHER VERSIONS

No details on any other version of *Scorpion* are currently available.

● EXPRESS VERDICT

While *Scorpion* is a reasonable first release, it regrettably incorporates many unsatisfactory elements – namely its tedious, unoriginal gameplay and odd mix of visual ideas – producing a game neither special or entertaining.

Scorpion is disappointing. Hopefully Digital will do better next time...

✪ ✪ **Rik Haynes**

• Jumping from your speedboat onto the Pirate Galleon

WAR IN MIDDLE EARTH

MELBOURNE HOUSE

C64 £9.99cs, £14.99dk
Also on Spectrum, CPC
Out around Easter on ST, Amiga, PC

• In the lands of Middle Earth

In golden days of old, before the day of the 16-bit, there came a licence deal between Melbourne House and the publishers of the works of J.R.R. Tolkien. The first of these micro game versions was *The Hobbit*, an adventure game more noted for its bugs than quality of gameplay. Then came *Lord of the Rings*, a menu-driven adventure marred by slow speed of operation. Now there's *War in Middle Earth*, a wargame by Mike "Lords of Midnight" Singleton...

● GAMEPLAY

Taking the role of the Hobbit Frodo Baggins, you set out with the help of your friends and allies to the land of Mordor in order to cast "The One Ring" into the Cracks of Doom, thus defeating the evil Sauron and ending his grip over the kingdoms of Middle Earth. Unfortunately, it's not that simple a task, and along the way Sauron's forces will try to thwart your every manoeuvre.

War in Middle Earth is played over a map of Middle Earth, with you able to move your cursor around this and a zoomed-in Campaign Map, where you can gain information and issue orders to your forces. You can also select which character should be the ring-bearer. When combat occurs, everyone in your force involved in the action is represented and able to take part in the ensuing battle.

● GRAPHICS AND SOUND

Visuals perform their assigned duties well, but they're certainly not outstanding. Details displayed in the Campaign Map are clear, concise and informative. The combat sequence is competently drawn and animated.

Far less impressive is the audio, which seems to have been painfully bolted-on at the end of the games development.

● OTHER VERSIONS

The Spectrum and CPC versions are very similar to the C64, and are well worth a look. 16-bit *War in Middle Earth* trades-in the character involvement in the battleground for more character interaction in the rest of the game. The 16-bit preview samples we've seen look very promising, especially the VGA PC version. ST, Amiga and PC *War of Middle Earth* should be released in the next few weeks.

● EXPRESS VERDICT

Although *War in Middle Earth* is an admirable release which should appeal to Tolkien and wargammer fans alike, we just couldn't help feeling the huge potential for a computer game based on Tolkien's writings still hadn't been realised. Of course, there's always a chance with the sequel to the sequel to *Lord of the Rings*...

✪ ✪ ✪ **Rik Haynes**

• Issuing your orders on the campaign map

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Nothing Vektor'd, nothing gain'd

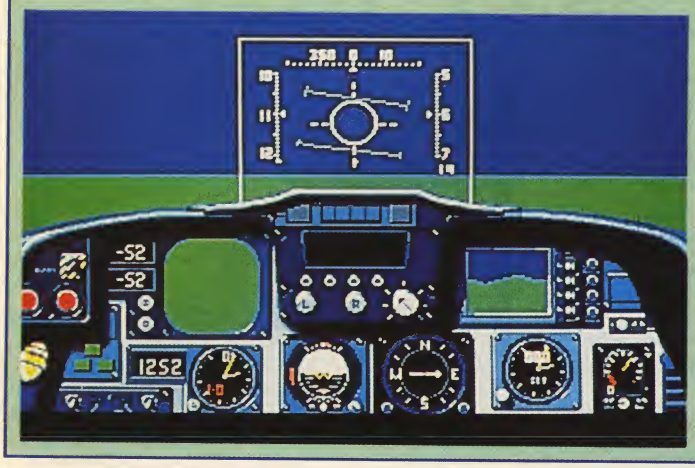
Rik Haynes previews five new releases, including the latest from Vektor Graphix

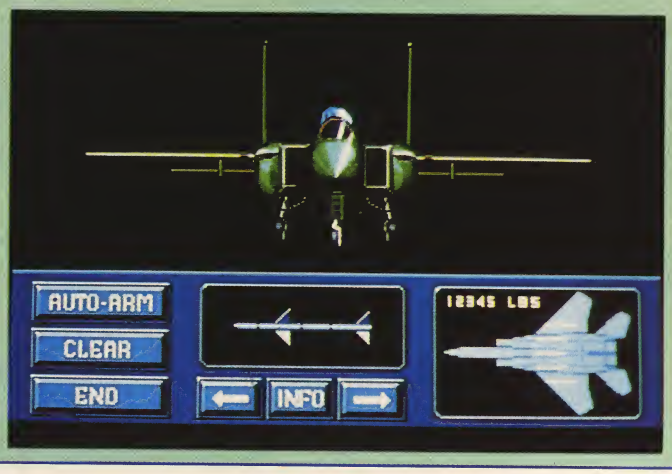
BOMBER • VEKTOR GRAFIX

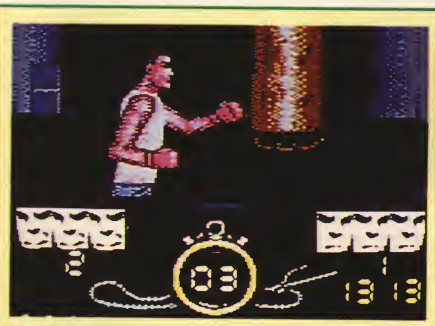
Vektor Grafix – the software development company responsible for the micro conversions of the *Star Wars* and *The Empire Strikes Back* coin-ops for Domark – is currently producing a game under their own name.

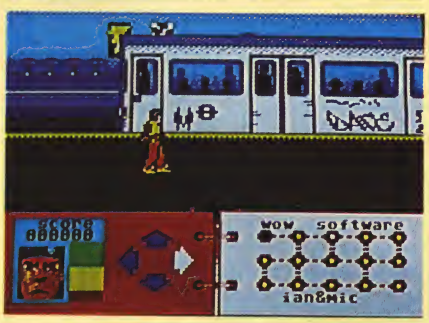
Bomber is an all-action, head-to-head flight-sim giving you the chance to fly any one of a possible 14 different aircraft – including a F-15 Strike Eagle, F-4 Phantom, F-111 Libya-special and even a Soviet Mig 27 Flogger.

Bomber is due for release soon on Spectrum, C64, CPC, ST, Amiga and PC .







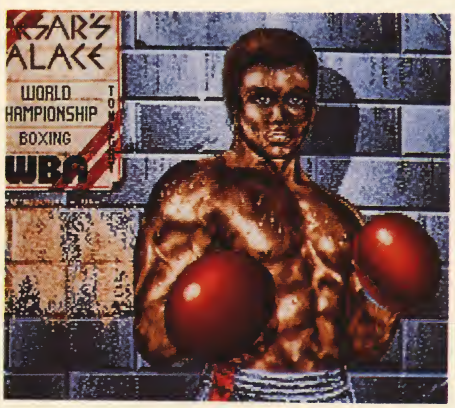


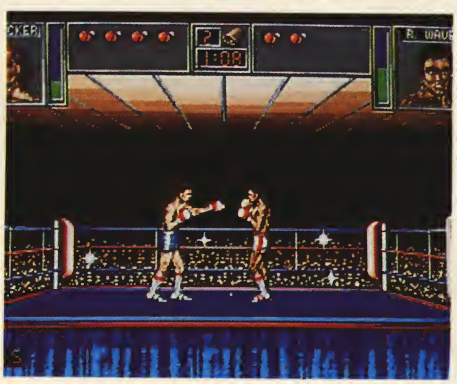
SUBWAY VIGILANTE & STREET CRED BOXING • PLAYERS PREMIER

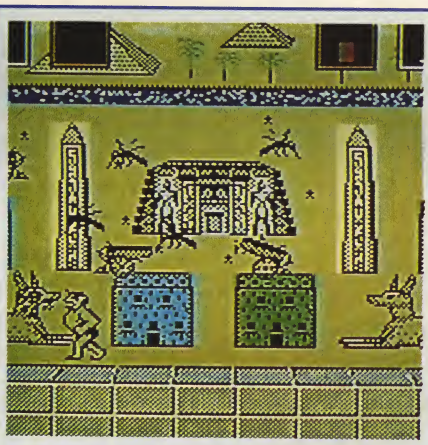
WOW! Software Developments, formerly Reptilia Design, is presently putting the finishing touches to two budget games on the C64 due for release next month. *Subway Vigilante* throws you into the dangerous 'Guardian Angel' world of the London Underground, forcing you to take on the scum of the city in your quest to protect the innocent. *Street Cred Boxing* sees you in a fight for the right to fight – as your favourite boxing gym is under threat from some unscrupulous yuppies who want to redevelop the site.

RINGSIDE • EAS

If you can't wait for the Bruno-Tyson rematch, then *Ringside* could be just the ticket, with you placed in control of a boxer itching to become the king of the ring. Along the way, you'll have to create and train your boxing alter-ego, learn the tricks of the trade and punch out ten opponents before reaching that coveted number one spot. Know what I mean, Harry? Out soon on ST, Amiga and PC.

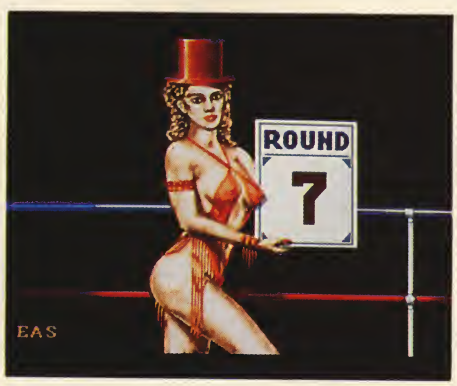






AAARGH! • MELBOURNE HOUSE

AAARGH! was originally an Arcadia Amiga-based coin-op game, and is based around the exploits of some 'rampaging' monsters. Out shortly on Spectrum and C64 – ST, Amiga and PC versions are already available.



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Computer chaos

Mel Croucher's contemporary archives of amazing, but true, computer cock-ups...

Vancouver Stock Exchange, 28 November 1983

Investors are amazed to find this morning's index at 1098.892, a rise of over fifty per cent! Spokeswoman Dawn Seasons admits that whereas the 1,500 stocks represented by the Index are calculated to four decimal places, they are only printed to three. Instead of rounding the last digit up or down, the computers have been chopping them off and flushing them down the electronic toilet. This results in the loss of an Index point a day, and nobody has spotted the glitch in twenty-two months of operation!
Toronto Star, 29.11.83

Cape Kennedy, Florida, 1969

Armstrong, Aldrin and Collins blast off for humanity's first voyage to the moon, just! Mr Joel Aron of IBM's Federal Systems Division is responsible for a large part of the software, and while in a 'relaxed condition' at the swimming pool admits that the Apollo software was 'full of bugs. In one of the trajectory computations we had the Moon's gravity repulsive rather than attractive.' His colleague Steve Olson asks when this fact was discovered, 'Oh,' says Aron, 'five days ago.'
(Steve Olson)

Portland, Oregon, USA

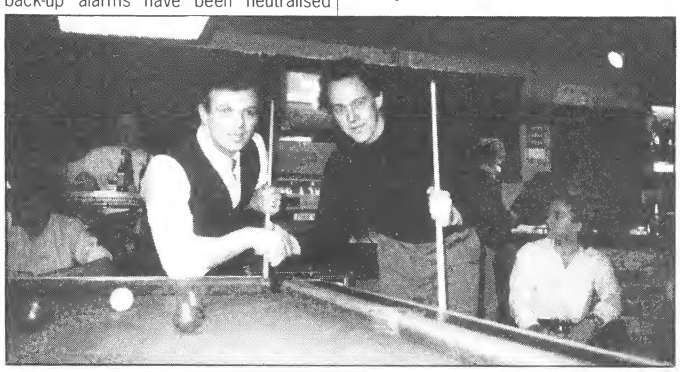
J Michael Read, the Tri City Service District supervisor, confirms that programmers are full of crap. When a burned-out wire halts the sewage treatment pumps between midnight and breakfast time on Wednesday, a programming error assure the automatic telephone alarms that everything is absolutely normal. Next morning 40,000 residents receive brown hot water from their shower heads, and an interesting new scent in their shampoo. One and a half million gallons of raw sewage have flooded the Willamette River, and the back-up alarms have been neutralised because they 'disturb the night shift.' Matters are 'put right.' At 3am on Monday morning an electrical failure shuts down the pumps at the sewage station. The computer system has been modified so that computer operators can override computer commands in the event of such a failure, but only after another spillage stinks up the Willamette River is it discovered that the system doesn't work when the computers ain't got no power humming through them. Shirley Kengla, spokeswoman for the Oregon Department of Environmental Quality confirms that 'we have a major spill.' How major? This time it's five and a half million gallons.
The Oregonian, 22.9.88

The House of Representatives, Washington

On the 2nd of May, 1988, Congress votes on the vital funding bill for the Strategic Defence Initiative, commonly known as the computer-controlled 'Star Wars' project. It seems only natural that with the Americans putting so much faith in computers, they use one to register their votes. The result is 358 'ayes' against 237 'nays'. The House of Representatives has 435 members...
Gary Chapman, Software Engineering Notes

Hong Kong, 10 July 1984

The death is announced of 58-year-old Chin Soo Ying. In 1950 he built a computer named Tsen Tsen based on the British Colossus machine, and he went on to modify it over the years to enhance its intelligence and give it concepts of love and emotion. Recently he constructed a new machine named Woo Shi, and put his 34-year-old Tsen Tsen to one side. His widow states that Tsen Tsen became jealous of the new model, overloaded herself, and fatally electrocuted her creator, simultaneously committing suicide.
Weekly World News



• In the course of reviewing 3D Pool this week, *Express*'s Andy Storer was challenged by World Pool Champion 'Maltese' Joe Barbara to a match. In a surprise result, Joe sneaked home by the odd couple of frames in the two-frame challenge. For those of you watching in black and white, Andy is the one in the red sweater.

NEXT WEEK

Graphics
The Art of the Micro: the complete buyer's guide

Public Domain
How to take copies of all the best software for your machine – legally

Paint job
De Luxe Paint 3: reviews and interviews

History of the QL
The story of the Great Leap... where?

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Shoot from the Lip... *the week's most quotable sayings*

"If it comes to a shoot out we'll do fine. We're good cowboys."
Microsoft's techno billionaire Bill Gates on facing up to the competition.

"Windows 386 is cooler than Windows 286 but it does cost twice as much so the coolness to price ratio is about the same."
Gates again

"The Amiga beater? We don't need to beat Commodore. They do that themselves."
Atari UK's boss Bob Gleadow when asked about the 'Amiga beating' Super ST.

"I would not like to explain to relatives of a victim killed by someone hacking into an air or railways system that the police have no power to interfere until after someone is dead."
A police computer crime specialist to *The Observer* on the escalating dangers of computer hacking.

520ST-FM SUPER PACK

1Mb DISK DRIVE
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Ikari Warriors	Elite	£14.95
Marble Madness	Electronic Arts	£24.95
Quadralien	Logotron	£19.95
Ranarama	Hewson Consultants	£19.95
Return To Genesis	Firebird	£19.95
Roadwars	Melbourne House	£19.95
Starquake	Mandarin	£19.95
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Wizball	Ocean	£19.95
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Summer Olympiad '88	Tynesoft	£19.95

PRODUCTIVITY SOFTWARE

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With SM124 mono monitor: £498 INC VAT With SC1224 colour monitor: £698 INC VAT

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All prices correct at the time of going to press. E&OE

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£499 INCLUDING VAT

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2Mb & 4Mb MEGA ST

The MEGA ST computers are styled as as lightweight keyboard with a separate CPU, connected by a coiled telephone style cable. There are two versions of the MEGA ST, one with 2Mbytes of RAM and the other with 4Mbytes. Each version has a 1Mbyte double sided disk drive built-in to the CPU unit. The MEGA ST's do not come with modulator built-in and must therefore be used with a monitor. With every MEGA ST purchased, we will add the 'Professional Pack' software (worth £384.83) detailed above, plus the Silica ST Starter Kit (worth over £200) both Free Of Charge. Return the coupon for further details.

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+colour monitor=£1198

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£1199 INC VAT
+mono monitor=£1298
+colour monitor=£1498

DTP PageStream £149 +VAT =£171.35

Desktop Publishing (DTP) is one of the fastest growing applications for personal computers. We are pleased to announce a powerful low cost package for the Atari ST called PageStream. PageStream costs only £149 (+VAT=£171.35) and, because it works with an Atari 1040ST and a Seikosha SP-180AI printer, you can be up and running with a complete system for less than £1000. Some of the features of PageStream are listed to the right. If you would like further information on this program, complete and return the coupon below, ticking the 'DTP' box in the corner.

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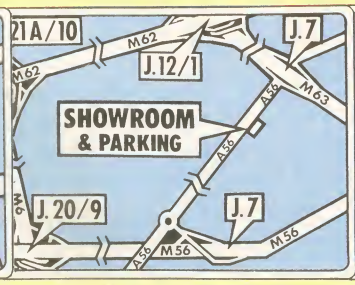

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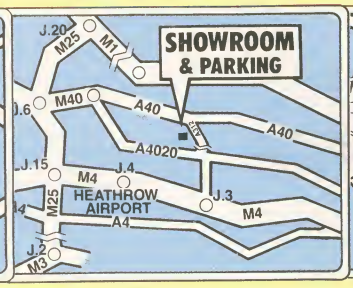

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